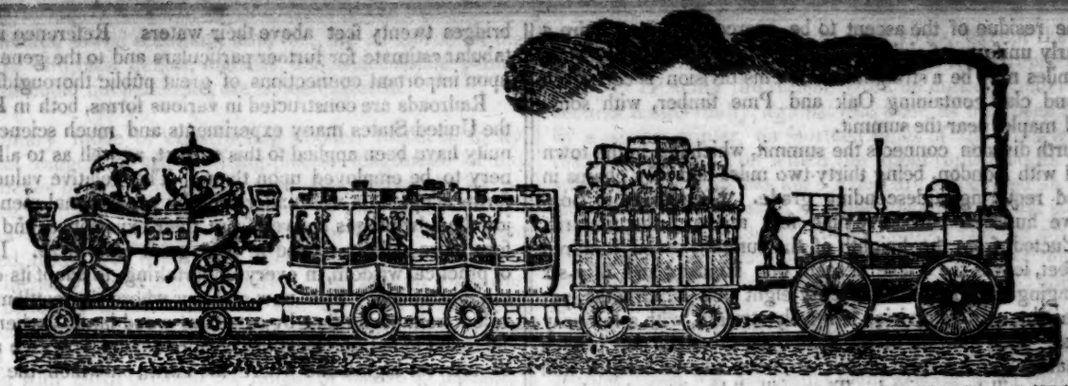

AMERICAN RAILROAD JOURNAL,
AND ADVOCATE OF INTERNAL IMPROVEMENTS.

PUBLISHED WEEKLY, AT NO. 30 WALL STREET, NEW-YORK, AT FIVE DOLLARS PER ANNUM, PAYABLE IN ADVANCE.

D. K. MINOR, and GEORGE C. SCHAEFFER, (EDITORS AND PROPRIETORS.)

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AMERICAN RAILROAD JOURNAL.

NEW-YORK, JULY 22, 1837.

In giving the extracts of the following report to our readers, we beg leave to state, that it is utterly out of our power to publish the whole of the document, (36 pages) particularly as much of it is matter of local interest only, and containing information and advice relative to the organization and operations of the Company and Engineer Department, highly useful to those to whom the report is addressed, but a matter of every day business with our readers.

The impossibility of separating the two sorts of information gives an unconnected appearance to the portion published, which we the more regret as it does not enables us to do justice to the research displayed by Mr. Johnson, not only in the professional details, but also in those portions relating to the "economy" of railroads and internal navigation.

REPORT.—TO THE PRESIDENT AND DIRECTORS OF THE LONDON AND GORE RAILROAD:

In executing the important trust reposed in me, as your chief Engineer, I consider myself fortunate in the selection of persons employed to aid me. My principal assistant, in the labors of exploration has been Mr Tracy McCracken. Supplied with all the needful instruments and a select party of assistants and laborers, Mr. McCracken has prosecuted the preliminary surveys, with great industry and perseverance. He has traversed the line of country from Hamilton to Chatham, running double lines, some portion of the distance, examining with much care difficult points of the route, and taking partial views of the country from Hamilton to Queenston, and from Chatham to Sandwich. These services have been impeded by a partial outfit, by unfavorable weather, by all the obstructions of a wilderness most of the way, and, along the valley of the Thames, by the necessity of moving their baggage and provisions down the river in a boat, while their line of operations lay from two to six miles distant. Their work commenced the twenty-seventh day of July, and their field work closed the first day of November.

* * * * *

In calling your attention to the London and Gore Railroad, and to the path of my professional duties, I propose to divide the line into five principal divisions, as follows:

The first division will extend from Burlington Bay, at the village of Hamilton, in a westerly direction along the slope of the great terrace, ten miles and six chains, to a dividing ridge, between the basin of Lake Ontario and the valley of Grand River. The elevation of this ridge is 575 feet above the lake. It is nearly broken through at this point of intersection, being not more than one-fourth of a mile across and composed of sand laying with a steep declivity to the east. Its western declivity is broken by ravines formed by the land drainage into the Welland and Grand River. At one point, this ridge is reduced by a narrow defile and depression of forty feet. Here we propose to pass the railroad on an excavation of thirty-three feet and twenty-seven one hundredths, giving us at the place of passage, an elevation above our starting point of five hundred and one feet and seventy-three one hundredths. This heighth may be attained by a uniform grade, of forty-nine feet and eighty one hundredths per mile, subject to more than ordinary expense of grade in passing one mile on the edge of a perpendicular rock terrace, and passing two principle ravines. It will require extra cutting at, and near the summit.

The second division extends from the ridge to Grand River, a distance of thirteen miles and 40 chains, to the bridge at Brantford. Grand River is here four hundred and ten feet above the waters of Burlington Bay, and we design to cross it thirty feet above the stream. This will give the road a descent in this division, of sixty-one feet and seventy-three one hundredth, averaging four feet, and fifty-seven one hundredths per mile. It is proposed to lay this portion of the road straight, from the east end to a point opposite the Mohawk village and from there nearly straight to Brantford. This division is intersected by Fairchilds' creek, running in a deep ravine and by several smaller creeks, requiring embankments or bridges. It abounds with Pine and Oak timber, and has a clay soil, with occasional deposits of sand above the clay.

The third division stretches from Grand River to the summit, dividing its waters from those of the east branch of the Thames. This summit is seven hundred and twenty-six feet above the waters of the Bay. And the length of the divisions is twenty one miles and thirty-five chains. In this division our line rises two hundred and sixty-five feet, allowing for an excavation of twenty-one feet, at the summit; and would require an average rise of twelve feet and thirty-six one hundredths per mile.

The only obstruction to the economical grading of this division occurs in passing Grand River valley, and reaching the Burford plains, which are one hundred and eighteen feet above the river crossing, and will require a rise of thirty feet per mile, in a direct

line. The residue of the ascent to be overcome, will require a grade nearly uniform of eight feet and forty hundredths per mile, eighteen miles may be a straight line. This division is composed of sand and clay containing Oak and Pine timber, with some beech and maple, near the summit.

The fourth division connects the summit, which lies in the town of Oxford with London, being thirty-two miles and fifty chains in length, and requiring a descending grade. King-street in London is five hundred and forty nine feet above Lake Ontario, which deducted from the heighth of the summit, seven hundred and five feet, leaves the whole descent one hundred and fifty-six feet, averaging four feet and seventy-eight one hundredths per mile. The line on this division is mostly straight, with a few easy curvatures. This portion of the road must cross the east branch of the Thames, and several minor streams, where bridges and embankments will be required. They will all be situated in places favorable to their construction. The timber here is chiefly pine, some beech and maple and white cedar. The line passes near Woodstock, Ingersoll-ville, Beach-ville and through an old farming district in the vicinity of those places.

The fifth division extends from London to Chatham, sixty-four miles and forty-two chains. At Chatham, the land of the village is twenty feet above the water of the river and three hundred and thirty-one feet above Lake Ontario. This division descends two hundred and eighteen feet, which gives, in the average three feet and thirty-eight one hundredths per mile. A level grade will be continued the first eleven miles, from London, which deducted, will give an average grade of three feet and ninety-three one hundredths per mile; and will in no place exceed a maximum grade of seven feet.

From London the first ten miles, in leaving the bounds of the valley some curvature occurs, the residue of the distance, a straight line may be selected. This division presents a surface remarkably favorable. The east branch of the Thames requires to be crossed at London. On this division the timber is oak, beech, maple, whitewood, and black walnut rising out of a clay soil.

The whole length of road is one hundred and forty-two miles and thirteen chains.

Whole ascent westward, first and third division seven hundred and sixty-six feet and seventy-three one hundredths. Eastward, second, fourth and fifth division, four hundred and thirty-five feet and seventy-three one hundredths.

In reference to the resolution of your Board requiring an examination of the country from Chatham to Sandwich; also from Hamilton to Queenston, being parallel lines with steam navigation I would respectfully state that such examinations have been made, and the subject of your inquiry connected therewith duly considered, and the result is and I am happy in stating, that either of these divisions present very favorable features. I have designated that portion from Chatham to Sandwich as the sixth division in the tabular estimate herewith connected, and that portion from Hamilton to Queenston as the seventh division.

The country from Chatham along the Thames, Lake St. Clair, and the Detroit River, rises to a slight elevation above those waters, and is intersected by extensive marshes on a lower level. A line from Chatham may be traced in one continued direction to intersect the Detroit River at any point; or it may follow the border of the Rivers and Lake without departing materially from a direct line. No grading will be required other than to inclose the timber work, and no stream will be passed requiring any expense other than to leave a passage of the flood waters.

The seventh division on the inspection of the map presents the route from Hamilton to Queenston. This may be passed in nearly a direct line which approaches the lake shore for several miles in the vicinity of the Twenty-Mile-Creek. From a point east of Port Dalhousie to Queenston, between the Ridge Road and the lake the country descends gradually to the shore of the lake where the bank is low. From Hamilton eastward, the surface is of the same character, leaving about nine miles in extent along the shore that is obstructed by a high table of land jutting down from the mountain, and forming banks from forty to fifty feet above the water. This table of land is broken through by deep ravines near the Twelve and Twenty mile creeks and other smaller streams. The several difficulties existing on the great highway passing a little in the interior, for the location of a Railroad do not show themselves near the Lake shore where the several indentations occasioned by streams may be easily passed by bridges twenty feet above their waters. Reference is had to the tabular estimate for further particulars and to the general remarks upon important connections of great public thoroughfares.

Railroads are constructed in various forms, both in England and the United States many experiments and much science and ingenuity have been applied to this subject, as well as to all the machinery to be employed upon them. The relative value of all the forms adopted, is well understood by professional men. You enjoy the advantages derived from their experience, and may therefore more safely proceed in your great enterprize. It is the part of practical wisdom, in every undertaking, to adopt its exertions to circumstances. In a new country where the settlements are divided from each other by extensive wood lands—where stone is to be found in but one location—where capital is scarce and the rate of interest high—and where the earth, on which the works must rest, is slippery and soft with few exceptions, prudence dictates the adoption of different methods from those which may be most suitable under different conditions.

Having retired for fifteen years from the professions of a Civil Engineer, (in consequence of extensive engagements in active enterprise in Western New-York,) I am principally induced to resume the profession, from the excitement incident to the introduction of railroads, which is an item in the many important improvements of the age, and which has very much engrossed my thoughts for several years. I have compared all the forms of constructing them, which have come to my knowledge. After diligent enquiry, with much solicitude, in reference to the cardinal points of economy in their construction, durability and efficiency, and as your Engineer, I take leave to recommend one, which I have adopted, and believe most applicable to your views. It is of the following description.

1st. Blocks of round timber, from 18 to 24 inches in diameter, sawed with parallel ends, at right angles with their length, are placed in an upright position, with one end resting *firmly on solid earth*, from which all roots and top soil are carefully removed.—Of these blocks there are two lines, 5 feet apart, from centre to centre across the road. These blocks will vary in length according to the surface of the ground compared with the grade level.

2d. Timber 9 feet long, one foot in diameter, spotted on the under side where they are to rest on the blocks, and cut down six inches deep, in a notch 15 inches wide, above the blocks where they are to receive the string-pieces. These are to be placed across the road from block to block, each end extending outside of the blocks upwards of one foot.

3d. String-pieces from 18 to 14 inches in diameter, and either twenty or thirty feet in length. These must be squared at each end, one foot square and at each intermediate ten feet where they are to rest upon the cross timbers above the blocks, and parallel with each other, in two lines lengthwise, of the road. They must be well hewed on the upper side and firmly keyed into the cross timbers.

4th. Scantling 3 by 4 inches, square, placed on their broadest side must be extended along the top of both lines of string pieces, parallel with each other.

5th. Above the scantling, in exact parallelism, are to be placed two ranges of iron bars five or six-eights in thickness and two and a quarter inches wide; and then, the iron bars, and the scantling are firmly secured to the string pieces, by spikes seven inches long driven through them both and into the string pieces.

After the road is located, and the grade line established, the timber work is completed, on all parts of it requiring embankment and not subject to a cutting of more than two feet in depth. A kind of working car is then used of simple construction, with four, six or eight wheels, having either of them four boxes, so contrived, as to discharge half their contents between the two lines of string pieces, and half without them, and carrying a cubic yard of earth to each wheel, and thus the embankment is made. Where the cutting is deeper, these cars advance one or two hundred feet, on temporary ways, being moved by horse power, and as the excavation proceeds the permanent timbers are all duly placed and secured, and the road completed. The timber work is all covered by earth within the grade to the surface of the iron except room for the flange of the wheel. Any kind of timber may be used for the blocks and cross timbers; the string-pieces should be made of the best timber afforded by the line of the road, or the adjacent forest.

The earth for embankments, and in excavations, stone and

Division No. 4th, 32 miles 50 chains. | One superintendant to be allowed full time

lime for culverts, sawed scantling, iron, &c., are all moved on the line by cars. Forests, defiles, marshes, and inaccessible points, where teams could not penetrate, are accommodated.

* * * * *

The ordinary mode of constructing wooden roads, is to lay two parallel ranges of sills or string-pieces, lengthwise of the road, six inches by six inches square, or four inches by six or eight square, or plank two or three inches by nine or twelve inches, sawed timber with cross pieces laid at right angles with those placed, from three to five feet apart, eight feet long, and five or six inches by eight inches square. The rails on which the iron rests, being six inches square or five by seven inches, and the iron consisting of bars five-eights by three-fourths inches wide. All this structure is placed on the surface of the grade, and filled in with earth between the ranges of sills so as partially to cover the cross pieces, for a horse path. On some roads the wooden rail has been secured by chairs or castings, to stone blocks placed in deep beds of rubble or pounded stone.

The more expensive and substantial roads of stone and iron are of various forms. The edge rail resting in choirs on stone blocks of various patterns is used in some cases; and in others the T Rail resting on cross timbers bedded even with the surface of the grade, and placed three feet apart, with splicing chairs: and in other cases still, the T Rail resting upon stone blocks; or in place of cross timbers, split stone seven feet long, about one foot square, resting on a bed of stone eighteen inches in depth, the whole width of the track. The expense of constructing these several forms of road, varies from fifteen to fifty thousand dollars per mile.

The expense of some of these forms of railroads, constitutes a fatal objection to their adoption in the Province, and under present circumstances, ought not to be incurred, if capital wer ever so abundant.

1st. Experience has shown that the sawed timber roads are objectionable, when applied to such soils as belong to your route, because the timber work has not a sufficient bearing surface to resist the action of rains, which settle them into the grade; and they cannot sustain the pressure of locomotives with heavy trains.

2nd. The timber work is placed in the most exposed situation possible, and the form of preparing the cross timbers subjects them to the most rapid decay.

3rd. The timber is too light, yielding under the weight of the engine. This yielding and the settling together of the joints formed by the cross timbers in *horizontal sections* of the road offer an obstruction to the passage of the wheels equal to a slight ascending grade.

4th. In our climate the *winter* frosts produce great injury on all such timber roads. The cross timbers being covered with earth, when this earth freezes, (which is the most exposed part of the surface) the cross timbers are raised from the sills, and thus a derangement begins, which spreads and becomes considerable every year, especially in winters of great severity.

As the evils disclosed themselves to my observations, it became a great object to contrive the means of avoiding them, and introducing improvements combining durability, strength and economy. These are requisites of especial importance in new districts; and difficult of attainment in soils rich and deep, and liable to hard frosts. They result in an eminent degree, from the method of construction which I have recommended. That method finds most of the materials on the spot in the heavy forests which encumbers the soil, and which may be brought into and constitute a principal part of the structure, at an expense scarcely greater than would be incurred in removing it out of the way. This very valuable feature of *my* plan, adapts it most happily to your road, where upon the old methods, the timber could not be sawed and delivered without exorbitant cost; and where there is timber standing within the limits to be cleared, sufficient to answer all the demands for that article. Using large timber in its roughest form, saves the great labor of scoring and hewing it, gives unyielding firmness to the frame work in the grade and provides ample strength for the transit of any amount of tonnage. The size of the timber and covering it, (except the top of the scantling) with earth secures its soundness for a great length of time. My examinations of timber in similar situations convinces me, that in close or clayey soils that it will endure from thirty to fifty years, except the scantling, which is but little expensive and may be easily replaced when it decays. Placing the timber work so entirely under the grade, secures it effectually, against the frost, as has been fully tested by a severe winter, on fourteen miles of the Tonawanda Railroad. The blocks on which the upper timber works rests, are a substitute for stone blocks. They are so covered as to be durable, and so situated as to increase the strength and steadiness of the cross and longitudinal timbers amply sharing up the superstructure in any description of soils, and under any pressure from above, which secures the road for use, while embankments are requiring solidity.

The scantling and iron plate incorporated with the large string pieces by strong spikes, throughout their entire length, have a bearing which will not permit them to settle at all from the grade line before or under the wheels of the engine, thus leaving the locomotive its utmost power of traction, and compared with stone and iron roads has that medium of elasticity most favorable to the durability of the Engine, and cars. Experience has shown, that the great difficulty of keeping in exact adjustment the several parts composing a stone and iron road, creates a serious tax annually, in the destruction and wear of its machinery.

This plan of construction materially reduces the time and expenses of the Engineer department. The line is first located by transit centres, or tangent lines, and benches placed by the test level. This prepares the way for the timber work. This being completed, the Resident Engineer gives the levels upon the cross timbers, and transfers the points of curvature from the tangents, preserving the monuments on the straight lines, and directing the several grading parties to form their slopes, as they proceed with the excavations and embankments.

It avoids the tedious detail of staking out the work for the contractor or superintendent, replacing from time, the stakes lost by the cutting, grubbing, embankments, &c., and requiring all to be surveyed and staked anew when the timber or stone work in the ordinary mode is ready to be placed upon the grade.

ABRIDGED TABULAR ESTIMATE FOR A RAILROAD FROM BURLINGTON BAY IN THE GORE DISTRICT TO CHATHAM IN THE WESTERN DISTRICT.

Division 1st, 10 miles 6 chains.

From Burlington Bay to the summit between the valley of the Lake and Grand River.

	Miles.					
Sec. 1	1½	Cutting	51090 yards,	6d.	£1277	5 0
		Embankment	1000 "	"	25	0 0
2.	3½	Cutting	33000 "	"	825	0 0
		Embankment	21100 "	"	527	10 0
3.	5 6-80	Cutting	287000 "	7½	8968	15 0
		Embankment	150700 "	5	3130	11 8
		Rock Cutting	53000 "	3s.	7950	0 0
		2 Culverts	59689		400	0 0
		16 Box do.			200	0 0
	10 6-80ths				£23313	1 8

Division 2d, 13¼ miles.

From the summit to Brantford at Grand River.

	Miles.					
Sec. 1.	8¼	Embankment	180970 yards,	6d.	£4524	5 5
		Cutting	153000 "	7	4462	10 0
		Ditto	90300 "	5	1881	5 0
2.	5	Ditto	190400 "	6	4760	0 0
		1 Culvert at Faircilds Creek,			450	0 0
		4 do.	61460		1000	0 0
		20 Box do.			350	0 0
	13¼				£17428	0 0

Division No. 3d. 21 miles 35 chains.

From Brantford to summit between the Grand and Thames Rivers.

	Miles.					
Sec. 1.	4	Cutting	112,500 yards,	6d.	£2812	10 0
		Embankment	130 600 "	7½	4081	5 0
2.	17 35-80ths	Cutting	160,340 "	5	3340	8 4
		Embankment	203,110 "	6	5077	15 0
		Viaduct across Grand River,			3750	15 0
		2 Culverts			750	0 0
		28 Box do.			490	0 0
	21 35-80ths				£30,301	18 4

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Division No. 4th, 32 miles 60 chains.
From summit to London.

Sec. 1.	13 50-80ths	Cutting	69,300	yards,	7d,	2021	5 0
		Embankment	137,400	"	7	4293	7 6
2.	19	Cutting	184,800	"	6	4620	0 0
		Embankment	275,200	"	7½	8600	0 0
		1 Viaduct at River Thames,				2000	0 0
		1 do. middle branch of do.				1000	0 0
		Bridge at Cedar Creek				500	0 0
		4 Culverts				1800	0 0
		46 Box Culverts £20 each,				920	0 8
	32 50-80ths					£25754	12 6

Division No. 5th, 64 miles 42 chains
From London to Chatham 64 miles 42-80ths.

Sec. 1.	10	Cutting	135,400	yards	7½	£4231	5 0
		Embankment	145,700	"	8	4890	0 0
2.	54 42-80ths	Cutting	310,000	"	6	7759	0 0
		Embankment	485,400	"	"	12135	0 0
		Viaduct over Thames at London				2500	0 0
		Bridge at Dingsman's Creek,				500	0 0
		4 Culverts.				700	0 0
		60 Box Culverts,				1200	0 0
	64 42-80ths					£33906	5 0

ABSTRACT.

Division No. 1	10 miles	6 chains		23,313	1 8
" 2	13 "	40 "		17,428	0 0
" 3	21 "	35 "		20,301	18 4
" 4	32 "	50 "		25,754	12 6
" 5	64 "	42 "		33,906	5 0
	142 miles.	13 chains.		£120,703	17 6
Grubbing, Slashing, Clearing, and Timber work £250 per mile,				35,540	2 6
142 miles 13 chains Iron and sliding plates			£450	63,963	2 6
" " Spikes,			50	7,108	2 6
" " Sawed Scantling,			25	3,554	1 3
" " Laying Iron and Scantling,			25	3,554	1 3
Total,				£264,423	7 6

Remarks.—Least radius of Curvature 10,000 feet. Greatest length of continuous straight line 54½ miles. Reference is had to a general map showing localities, and to particular maps and profiles of line surveyed accompanying this Report.

Important scientific results and their explanation would accompany the minute details of a final location.

Reconnoisance of Division No. 6 and 7, and comparatively estimated as follows:

No. 6	£1 250 per mile,	50 miles	£62,500
" 7	1 500 " "	47 "	70,000

The expense of constructing the timber work, according to the plan herein recommended, is difficult at present to give you in all its detail. From the peculiar form of construction, the economy of doing the work by the day, and the varied character of the work in different situations. Perhaps it may be best ascertained by the following divisions into particulars. A great proportion of the way, the grade line of your road may conform very nearly to the natural surface of the ground; in which case it will be raised two feet above the surface; and require the standing trees to be cut, nearly even with the surface, to the width of the road bed about 14 feet; the large trees standing in the side ditches must be grubbed; and those outside of the ditches cut down with the usual height of stumps—occupying in the road bed, the ditches, and the chopping on both sides, a width of 100 feet. A mile of road will require 1036 blocks two feet in length, and from 18 to 24 inches in diameter, and 10,560 feet of string pieces, running measure, 18 to 24 inches in diameter, and in pieces 20 or 30 feet long each. All timber in the line not wanted for the above specifications must be placed outside of the ditches. To complete the timber work, on a mile of road of this description, within one month, allowing 24 working days, will require the services of the following persons, who will live together in a shantee on the line, and find all their provisions cattle, forage and implements, to wit:

One superintendant to be allowed full time				
	26 days,	7s. 6d.	£9	15 0
One Principal Hewer,	24 "	7s. 6d.	9	0 0
One Assistant, do.	24 "	6s. 3d.	7	10 0
One Adzeman,	25 "	6s. 3d.	7	10 0
One Team, with two yoke of Oxen,	24 "	12s. 6d.	15	0 0
Fifteen, Axe and Saw Men,	24 "	5s.	80	0 0
Total expense,			£138,	15 0

Such is the amount of labor, and cost of preparing the timber work to receive the sawed scantling, and the iron, involving an expense for mechanical labor of only £24.

I have witnessed the execution of such a work costing £95 per mile.

A mile of such road would contain 12 eighty one hundredths of an acre, which to clear and fence, and prepare for a crop, at £5 per acre, would cost the farmer £64 0 0 nearly half the amount required to clear away and prepare the timber in the form proposed.

To prepare the grading of this mile, the broad bed being 14 feet wide, and the earth having a slope one and a half foot base to a foot rise, and covering the timber to its upper surface, requires the excavation of ditches 2½ feet deep, 2½ feet wide at bottom and 10 feet wide at top with a slope as above, and containing 6104 cubic yards of earth which at 6d. per yard amount to £152 12 0

And to this the cost of timber work as above 138 15 0

And the aggregate is £291 7 0

Where the grade line adopted requires 3, 4 or 5 feet cutting and embankment the expense of grading would be greater, though in such cases the ditches would only be required in the cutting, and be of less dimensions, to answer the purpose of drainage.

* * * * * *

In our desire to illustrate and enforce these facts and principles, we have some fear, that we may be thought to have trespassed upon that respect, which is justly due to the high authorities of the Province, and the distinguished individuals engaged in various laudable schemes, for its internal prosperity. If in any degree we have seemed to commit this error, we feel that it would be unjust to suppose it intentional, and we hope to take shelter under the injunction of the worthy company in whose service we labor, to probe the subject submitted to us, in all its bearings and to state our facts and convictions, with perfect ingenuousness.

The Creator of the world has stretched out between the Canadas and the United States the most magnificient series of internal waters, that any where adorn His footstool. From these waters He has, for ages, sent forth His dews and His rains to clothe the vast interior with lavish fertility, and in the course of His good providence, He has recently spread along both their shores, free governments, and a population eminently capable of understanding and educing the means of individual and national advancement. You are an important part of this population; and you occupy a most important position. Can you doubt or hesitate as to the task assigned you? Were the richest bounties of the physical world designed to go forever unimproved, and unenjoyed by him, to whom dominion is given "over all the world?" The spirit of Internal Improvement, with a gigantic arm, has been long engaged below you, and beside you, in turning the lands and waters of wide regions into effective ministers of human good. You are evidently delighted with the spectacle, and you feel the general impulses it imparts. Then cherish the spirits which exhibits it. He is knocking at your doors for permission to enter and pervade every department of your Province. Give him welcome admission. Assist his beneficent purposes. Let no imaginary fears, no local views, no narrow competitions come in between you, and the most vigorous prosecution of your truest interests and your highest honor.

All of which is most respectfully submitted.

ELISHA JOHNSON, Chief Engineer.

Engineer's Office, London and Gore R. R. Co. Dec. 4, 1836.

AN ACCOUNT OF THE HARBOR AND DOCKS AT KINGSTON-UPON-HULL.

Continued from p. 440.

Slip way. In the summer of 1829, a slip, for repairing the mud boats and the lock gates, were built on the west side of the entrance basin, abutting upon the Humber. The length is 63 feet, the width 28 feet 6 inches, and the depth 11 feet at the lower end, diminishing upwards in the proportion of six horizontal to one vertical; the side walls are of brickwork, with stone coping; the bottom floor is covered with 3 inch fir plank, spiked to transverse sleepers, supported upon piles. The coping and front brickwork were set with Parker's cement and sharp fresh water sand, in equal proportions, and although exposed to the waves and swell of the Humber, have stood hitherto with scarcely a failing joint.

Lockage. What has been said on this head respecting the Old dock, applies also in a great measure here. Locking is begun when there is about the same depth of water, but the sill being 6 feet lower than in that dock, the work can be carried on longer, and fourteen or fifteen pens made at one time. As many as 25 sea-going vessels have passed this lock in a tide, thirteen of the largest when the gates were open for about an hour at high water, and the rest by penning.

There are usually three men to open or shut each gate, which they do in two minutes to two minutes and a half; but frequently two men do the work. With 6 or 7 feet of water on the sill, in average tides, the lock can be emptied or filled in about eight minutes, with all the sluices; but this is seldom done, no more than two sluices being generally opened, for fear of damage to the shipping or the works from the great agitation of the water: with two sluices, the time is about 14 minutes. It may be observed, that two men can easily raise or lower one of these sluices, with a full head of water, in five minutes.

State of walls. In concluding this account of the Humber dock, I would as before, briefly advert to the state of the walls and foundations, as found when taken down in executing the Junction dock.

The timber in the foundations, which was all fir, was, with the exception of the sap, invariably as sound and good as when first put down; the oak fenders, constantly under water, were also in a good state, but the upper part of many of them beginning to decay, and a few actually rotten; as were the horizontal fir fenders, and the oak ties near the top of the wall. The wrought iron varied considerably: in some places the spikes in the foundations were quite fresh and good, in others a little corroded, and in others almost rusted away.

The mortar generally very soft, but at wide parts, and especially the foundation of the old communication at Myton gate, so much so, that it might have been beat up without a drop of water, and used again. In the parts near the top of the wall not so much exposed to damps, the mortar was tolerably hard; but I saw none, except in the inverted arch of Myton-gate old communication, that would bear any comparison with that of the Old dock; the mortar in that invert, which was made from ground lime, mixed with a proper proportion of sand, and then ground again in the mill, was, however, so hard, and adhered so firmly to the brick, that it required a sledge and wedges to separate them. The mortar in the front of the wall had much the same appearance as that of the Old dock, being soft and very much out of the joints for nine or ten feet from the top; below this the joints were not wasted, but had thrown out a sort of stalactite or calcareous incrustation that entirely covered the face of the wall. Notwithstanding the soft state of the mortar in these walls, I am of opinion, from their being in general so well flushed or grouted as to be impervious to water, that it will ultimately acquire considerable hardness, although perhaps not for many years. This I infer from the state of the mortar in the Old dock and several other walls that I have had an opportunity of observing, built with nearly the same kind of lime.

The pozzuolana mortar, were always wet, or were wet and dry alternately, and also where constantly dry, was found in general exceedingly hard, being both in hardness and color very much like a well burnt red brick. This mortar usually adheres very well to the bricks, but sometimes not so well to the stone, partly perhaps from the stone being set too dry, which is commonly the case in summer, and partly from a property peculiar to mortar made from magnesian stone, of expelling or throwing the lime to the outside, either in a dry state, like *flour*, or where the walls are wet or damp, like *paste*; but whether arising from these causes or not, this want of adhesion detracts very much from its other excellent qualities as a valuable mortar for aquatic buildings.

The stone was found in a very good state, particularly the Dundee and Barnsley stone, a little above and below high water, was in places somewhat wasted and decayed, but in all other parts sound and good.

Repair of lock gates. The gates and hollow quoins of the entrance lock, having lately undergone some alterations and repairs, it may be proper in this place to notice their state and mode of reparation.

From a defect not uncommon in artificial foundations, the lock walls had subsided a little, and come over about three inches on each side at the top, thereby contracting the lock six inches, which caused the gates to open and shut badly; one of the gates in particular required four men to work it.

Mr. Walker, who was then engaged in the construction of the Junction dock, was called to advise on the subject, and recommended that these gates should be taken up, the hollow quoins brought to a vertical line, and afterwards secured by land ties. The gates were accordingly lifted in the spring of 1830, by means of two powerful crabs, and two sets of stout treble blocks and pulleys, with a 5 inch fall, one pair being applied at the head, the other at the heel of the gate, and the whole suspended from the butt ends of two larke oak trees, raised five feet above the coping, with the inner end resting on the ground, and kept down by two large stones, near four tons each; the chains to which the lower blocks were lashed, were fastened round the sixth bar from the top, blocking being placed between each bar upwards, the better to sustain the weight of the gate. Being thus prepared, the gate, weighing thirty tons, was lifted about eight feet, by a set of men at each crab, when, to take the strain off the blocks and tackling, a chain being passed several times round the gate-bar and the tree on the wall, the blocks were eased till the chains bore the principal part of the weight.

The hollow quoins were then dressed to a true perpendicular, and afterwards firmly secured by land ties, nearly similar to those of the Junction dock, which will be hereafter more particularly described. The quoins of the north gates could not be dressed down, on account of the water in the dock, but were securely land-tied in the same manner as the others.

The timber in the gates were all sound; but the bottom bar, from the great pressure against the sill, was worn away upwards of an inch in depth, and the heads and heels were also rubbed a little; the hoops at the foot of the meeting-posts were cut away an inch or more by dragging upon the traverse rails. The wrought iron straps and bolts were much corroded, and came off by a tap with a hammer in thick flakes; the cast iron sluices and frames were particularly soft for about an eight of an inch on the outside, and might be cut with a knife, like lead; the cast iron plates of the pointing sills were very rough, or in holes and furrows, as if eaten away.

After the repairs were all completed, the gates were lowered into their places. The time occupied in performing the whole was about eight weeks, during which there was very little interruption to the shipping.

THE JUNCTION DOCK.

It appears that a short time after the Humber dock was made, so desirable was a junction of the two docks considered, that a temporary canal was proposed to effect it; this would no doubt have been of great service, as at that time dock room was not so much wanted as a safe and expeditious passage between the docks, which such a canal would have given. This scheme, as well as the more effectual one of a new junction dock, was, however, from one cause or other, deferred till further delay would have been highly injurious to the commerce and trade of the town as well as to the interests of the Dock Company.

By a clause in the Humber Dock Act, the Company were required to make a third dock, whenever the shipping frequenting the port attained a certain amount of tonnage therein specified, provided a moiety of the expense was furnished them for the purpose. Some difficulties having, however, taken place in raising the stipulated supplies, the Company, impressed with the urgent necessity of making another dock, resolved, much to their honor to execute it solely at their own expense, and the necessary arrangements having been completed,

the work was begun in October, 1826, according to the designs and under the direction of Mr. James Walker, Civil Engineer, assisted by Mr. Thomas Thornton, the then resident engineer of the Company, as superintendent of the work, in which office he was succeeded, in the month of July following, by the writer of this account.

It is proper in this place to state, that in the early part of the year 1826, Mr. Telford was employed by the Exchequer Bill Loan Commissioners to survey and report upon the proposed works; and the Dock Company being desirous of having the best advice, availed themselves of the opportunity of taking the opinion of that distinguished engineer. His report in general confirmed the plans of Mr. Walker; the principal alteration recommended was the substituting of a lock at each end of the dock, for an entrance with tidal gates only, and it was adopted.

Area. This dock is six acres in area and is capable of containing sixty square-rigged vessels, with room for passing to and from the other docks.

Temporary works. The first preparatory works were the two coffer-dams, which were constructed principally of Memel timber; the south dam, or that next the Humber dock, was the largest, being 220 feet span, with a versed sine of 61 feet. The space between the two concentric rows of close piling, which were 6 feet apart in the clear, was filled to the level of the dock coping with clay puddle, the mud in the bottom having been previously well cleansed out; these piles were about 40 feet long and 13 to 14 inches square. The guage piles in front, forty-two in number on each side, were about the same dimensions, and had two rows of wale pieces, 13 by 8 inches, between them and the close piling on each side of the dam, all properly framed and bolted together. The close piling was connected together by an inner wale and cross braces near the top, and wrought iron tie rods lower down, and was further strengthened by a mass of loamy earth and loose bricks thrown in at foot.

On the concave side of this dam, and connected with it, was the temporary bridge. The road way, 24 feet wide, was supported by three rows of whole timber piles, braced together, and connected with the coffer-dam; and on their heads were transverse cap sills, carrying the bearing joists, which were covered with 3 inch planking and paved; a close boarded fence, six or seven feet high, was fixed on each side. From the great height of the dam, and there being at times a pressure of 28 feet of water against it, some of the piles were a little bent, and in very high tides the water found its way through rather freely near the top, particularly along the upper cross braces, but attention being given in time, no detriment to the works ensued. It was found in the repairs, that the puddle had settled from 6 inches to a foot below the cross braces, and that this was the principal cause of the leakage, as the earth for the puddle was good, and the work appeared well done.

In order to guard against accidents, a preventer dam was afterwards made across the centre of Myton-gate lock, in the form of a segment of a circle, the convex side being next the Humber dock. This dam was chiefly composed of tenacious earth well rammed, with a dry brick wall on each side, 6 feet thick at bottom, diminishing to 2 feet 6 inches at top, and including the walls was 30 feet wide at the bottom, and 8 feet at the top; it was carried to the height of the coping of the lock.

The gates also to both locks, after being hung in their places and finished, were well shored and braced, which turned out afterwards to be of the most essential service.

The north coffer-dam, at the west end of the Old dock, was 115 feet span, and the versed sine 14 feet. The plan of this dam and temporary bridge, and the scantlings of the timber, were similar to those of the other dam, except the piles, which were five feet shorter, the depth not being so great as in the Humber dock. This dam stood remarkably well, though there was sometimes a small leakage during very high tides near the walls and upper parts.

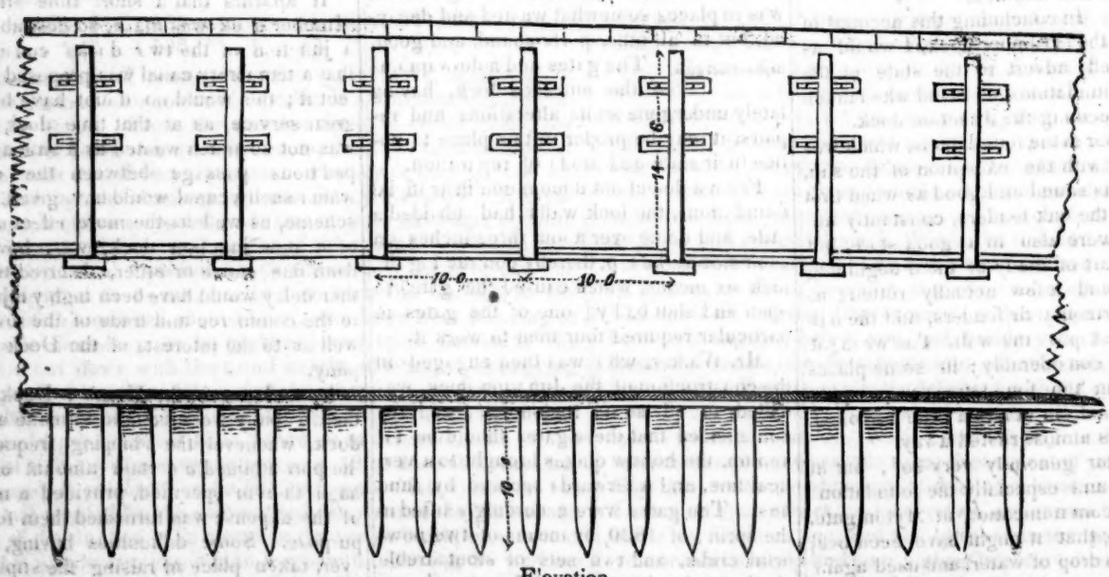
There were two cast iron pipes laid along this dam for supplying the town with water while the works were in progress.

Two steam engines, six horse power each, were used for clearing the works of water; that at the south end of the dock was erected about the same time as the coffer-dams, and was also occasionally employed for grinding the pozzuolana; the other was put up in the end of 1827, at the east end of St. John's church, and was principally employed in pumping the water out of the Whitefriar-gate lock and the north end of the dock; it was also sometimes used for pugging-mortar. This engine was taken down some time before the works were completed; the other remained until they were finished, a nine-inch pipe for conveying away the water having previously been laid through the west wall of the dock, and securely plugged after the engine had done working.

Water in the works. The water that arose in the excavation was not considerable; it was nearly pure, its slightly saline taste being caused, it is imagined, by its passing through the alluvial soil, which no doubt had been formerly deposited by the tide.

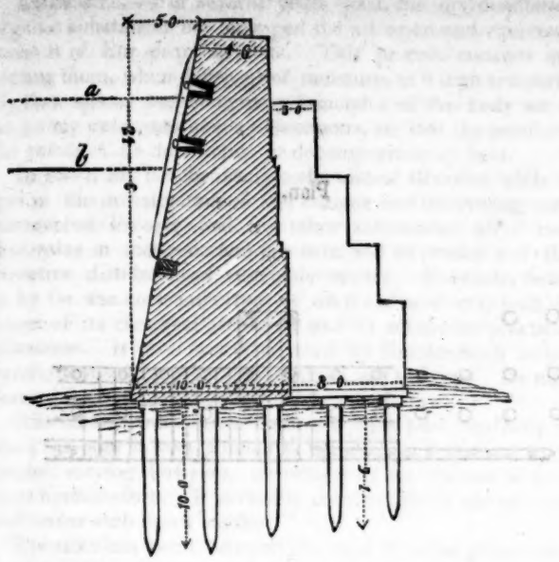
HULL DOCKS.

Plate 17.

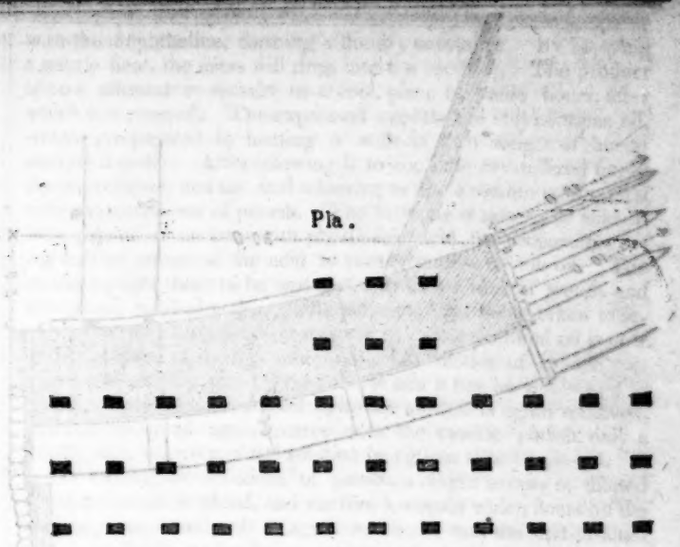


Elevation.

Gross Section.



Pla.



a, High water spring tides. b, High water neap tides.

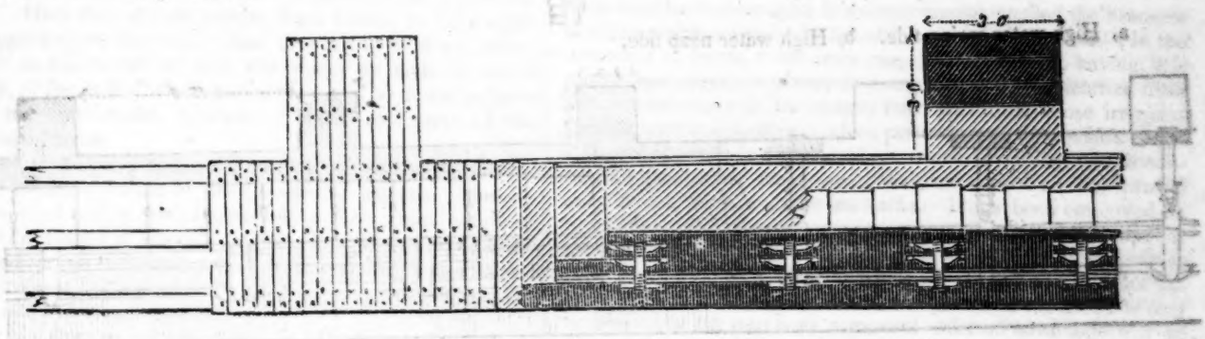
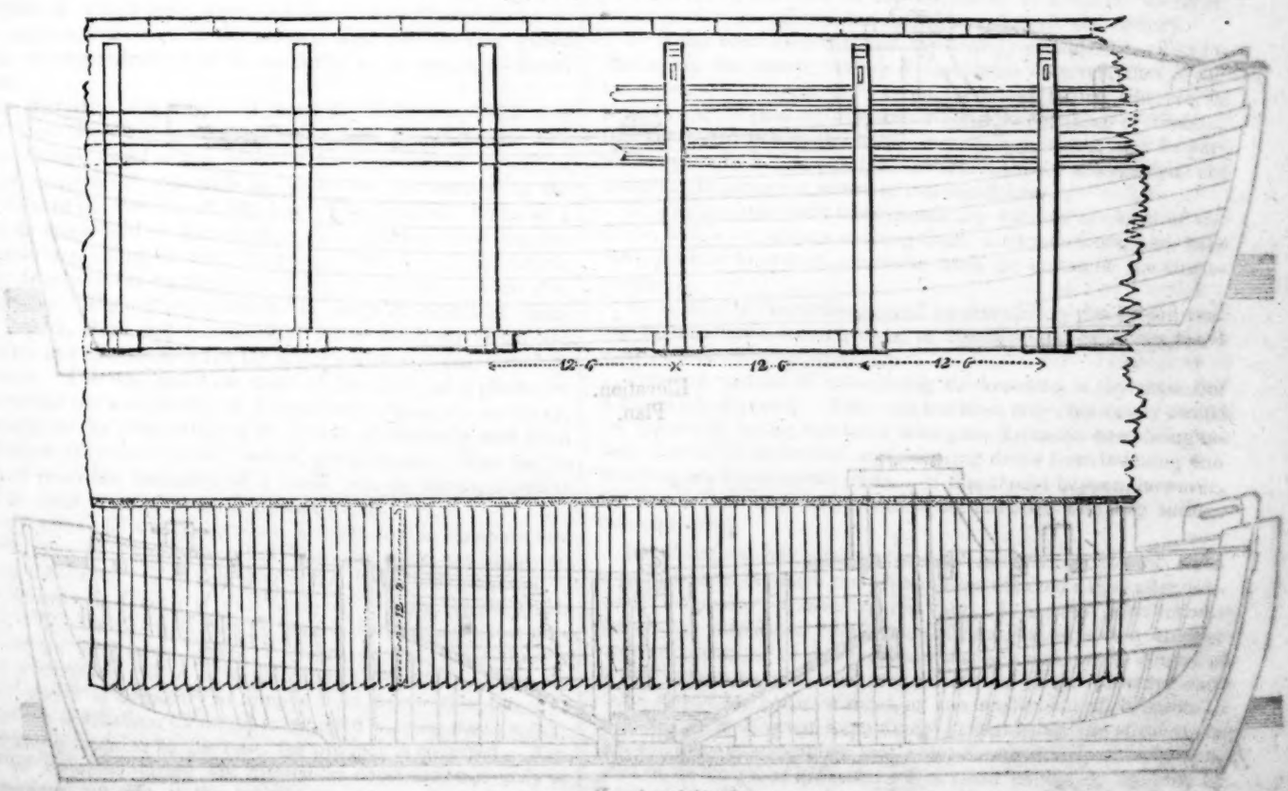
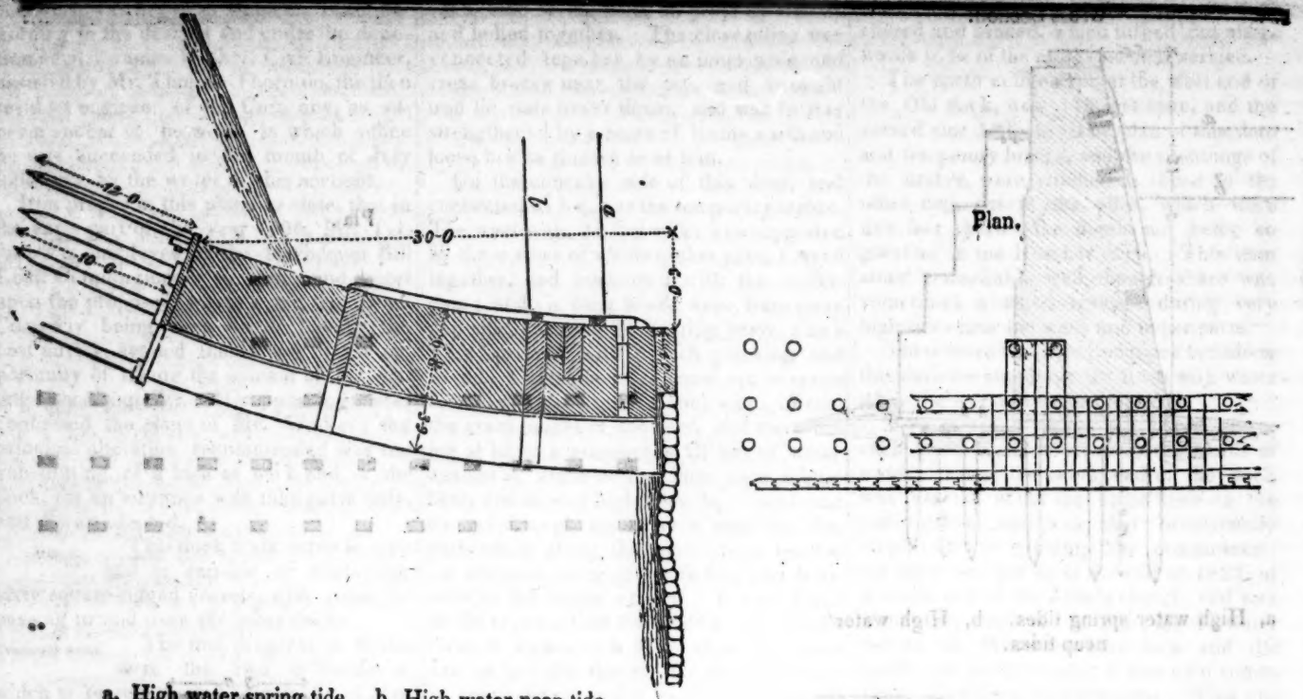


Plate 18.

HUMBER DOCK WALL.





a, High water spring tide. b, High water neap tide.

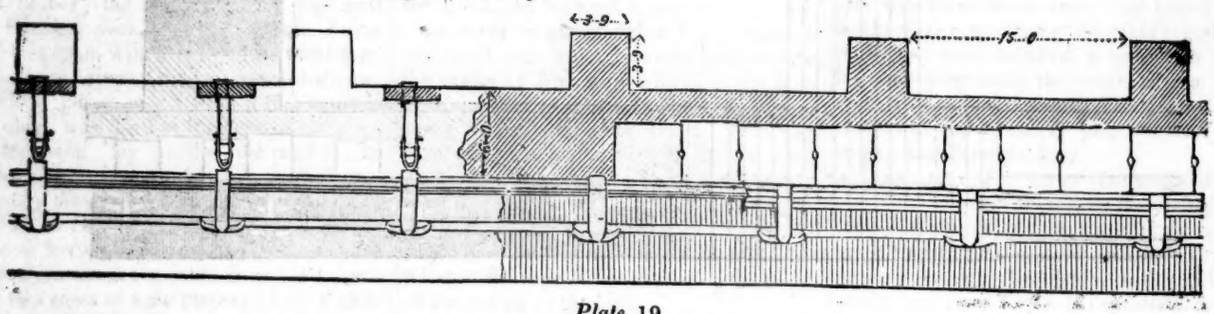
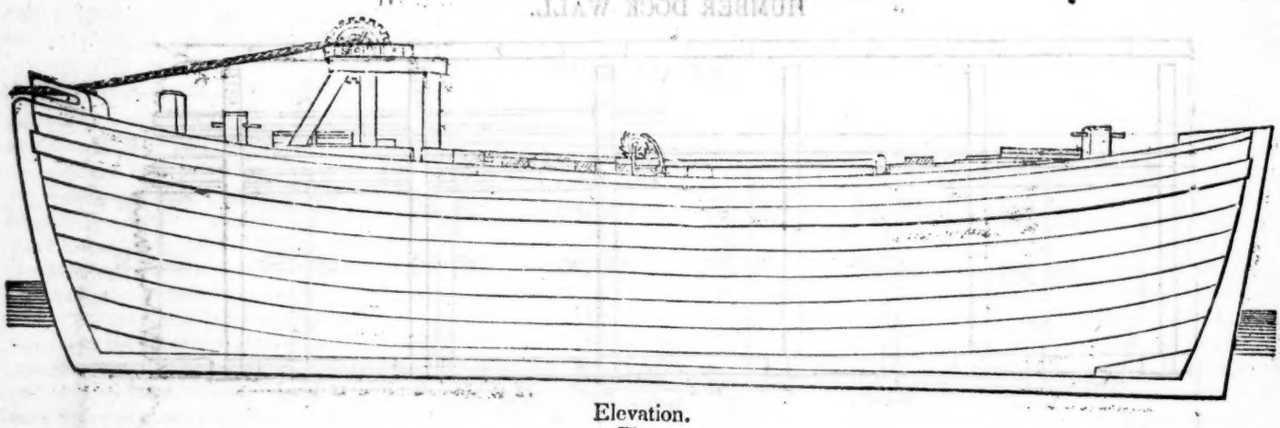
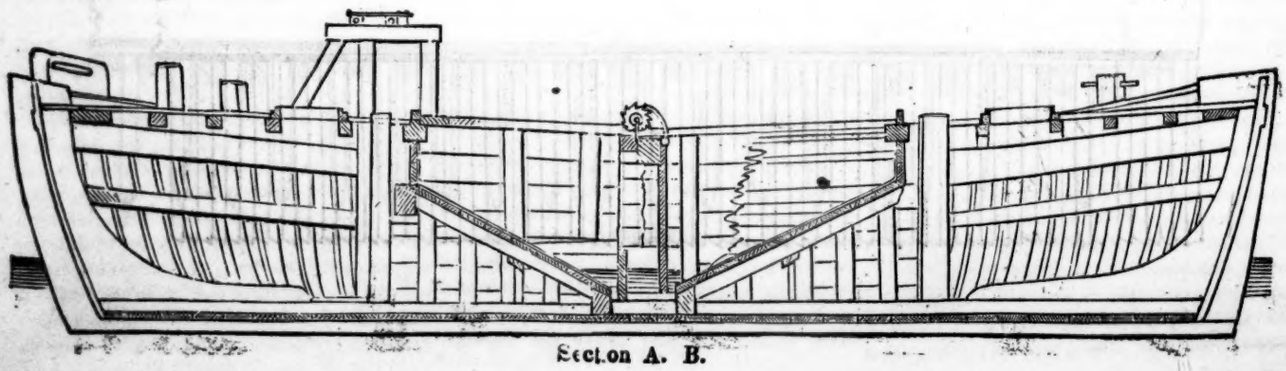


Plate 19.

HULL DOCKS. HUMBER DOCK MUD BOATS.



Elevation.
Plan.



Section A. B.

KREOSOTE.—For several years past, the dry distillation of organic substances has engaged the attention and exercised the interest of European chemists. This process consists in subjecting them, when deprived of moisture, to a high temperature. By this means the elementary principles of the body are acted on; they enter into new combinations, so that the products are the result of its destruction or decomposition by heat.

In 1830, M. Reichenbach, a chemist of Blansko, while engaged in the investigation of this curious and interesting subject, discovered kreosote and five other substances, all of more or less value in medicine and the arts, and all products of the destructive distillation of vegetable matter. Kreosote, however, is by far the most important of all these products, both on account of its chemical properties and its numerous practical applications. It was first discovered by Reichenbach in impure pyroligneous acid, and afterwards in all the tars. Its name is derived from the Greek *creas*, flesh, *sozo* I save.

It is an oily, transparent fluid, and when pure, perfectly colorless; its odor is very similar to that imparted to meat by wood smoke, varying, however, according to the species of tar used in its manufacture. It is readily combustible in the atmosphere and burns with much smoke.

Kreosote has been successfully applied to the preservation of fresh meats, and hence may become an important article in domestic economy. The meats intended to be preserved should be immersed in a solution of one part of kreosote in a hundred of water. Here they should remain from twelve to forty-eight hours, according to their size, when they are to be dried, either in the sun or before the fire, and afterwards set aside for six or eight days, at the end of which period they will be found to have acquired the consistence, appearance, smell and taste of the finest smoked meat.

Kreosote is probably the most efficient substance yet discovered for the preservation of dead bodies of whatever kind.—Birds poisoned with it resist putrefaction for a great length of time, and the bodies of animals may be *mumified*, so as to keep them sound for an indefinite period, by immersing them in a solution of kreosote in water, or by injecting a mixture containing kreosote into the blood vessels.

And indeed from recent investigations, it has been ascertained, beyond a doubt, that the tarry and resinous substances from which kreosote is chiefly manufactured, were the very articles used by the ancient Egyptians in the process of embalming, and by means of which their mummies have been handed down to after ages—mementos of the science and skill of that gifted people, as imperishable and as wonderful as the pyramids themselves.

It is stated in the Asiatic Journal for February, 1836, that Lieut. Col. M. C. Bagnol presented to the Royal Asiatic Society a human hand and a piece of beef, preserved by means of a preparation of vegetable tar found on the borders of the Red Sea, in the vicinity of Mocha. The Bedouin Arabs with whom he conversed on this subject, were of the opinion that this vegetable tar, called in their language Katran, was the article chiefly depended on by the ancient Egyptians in the process of embalming. They also believed that large quantities of camphor, myrrh, aloes and frankincense were used, but these are evidently not essential, as the tar alone penetrates and discolors the bone. The only use now made of this tar is as a plaster or ointment for the sore backs of horses and camels, rot in sheep, and lastly, in the preparation of the heads of criminals sent from the distant provinces to the seat of government. The tar is obtained from the branches of a small tree or shrub, which is found in most parts of Syria or Arabia Felix.

The process by which kreosote is procured is complex and difficult: that of Reichenbach has been simplified and improved by other chemists. The following is the mode recommended in the "*Annales de Chimie et de Physique*" of July, 1835, by M Koene. The tar derived from pit coal, is distilled in a retort provided with a long tube, having a large mouth. Under this is placed a receiver. The oil which comes over first swims on water; and it is necessary to remove from time to time the products of the distillation, till an oil is obtained which sinks in water When this is found to be the case, the product is collected. The heavy oil obtained during the distillation condenses not only in the receiver, but also in the tube of the retort, where it unites with the naphthaline, forming a buttery substance. By applying a gentle heat, the mass will drop into the receiver. The product is now allowed to remain in a cool place for some hours, after which it is pressed. The expressed naphthaline still contains oil, which is separated by heating it with its own weight of acetic acid till it melts. After allowing it to cool, the crystallized naphtha is pressed; and the acid adhering to the kreosote is saturated with sub-carbonate of potash. The kreosote is now to be shaken for a quarter of an hour with phosphoric acid, the proportions being half an ounce of the acid to twenty ounces of the oil. The mixture ought then to be agitated with its volume of water, and afterwards distilled with a graduated heat, care being taken to separate the oil which floats on its surface. The rectified oil is now to be dissolved in its own volume of a hot solution of caustic potash of the specific gravity 1.120. When it has been allowed to cool for half an hour, the oil upon the surface is again removed, and the heavy oil again treated with the caustic potash, only a fourth part, however, of the solution being this time employed.

On uniting the solutions of potash, a slight excess of diluted phosphoric acid is added, and the free kreosote which floats on the surface is separated. It is again rectified; and the first product which is chiefly water, being rejected, the kreosote comes over quite pure.

Kreosote has now been a sufficient length of time before the public, to enable us to ascertain pretty certainly and accurately its real value as a remedial agent.

Reichenbach, among his first experiments, applied the kreosote to slight *scalds*, in which he found it eminently beneficial. In the treatment of *burns*, it has been employed in France, having, it is said, a remarkable tendency to cause the sores to cicatrize from the circumference to the centre, thus preventing those irregular contractions, which often produce permanent disfigurement.

There is scarcely any disease, in which, according to the concurrent opinion of numerous physicians, kreosote has proved more beneficial than in the *toothache*. It has been employed on the continent for this purpose, ever since its discovery; and for the last two years, it has been prescribed very extensively in Edinburgh, and Dr. Cormack, says, with great success. But unless there be a cavity in the tooth through which the kreosote may be applied to the nerve, as a general rule, no advantage will be derived from it. Where the pain is merely rheumatic, a solution of kreosote and water is highly useful, relieving more speedily, certainly, and for a longer time, than any other remedy.

Various explanations of the operation of kreosote in these cases have been offered, but none seem entirely satisfactory.

1. It has been supposed that the remedy produced its effect by destroying the nerve; to this it has been objected, that if the nerve were destroyed, the pain would never return, whereas, in most cases, the pain returns after a considerable lapse of time.—But the destruction of the nerve, it may be rejoined, may be partial only, sufficient to paralyze its sensibility for a while, but not sufficient to prevent a return of this sensibility.

2. The kreosote may unite chemically with the albumen of the fluids, which are always exuding from a carious tooth, and thus form a crust to protect the nerve from the action of the atmosphere.

3. It may perhaps afford relief by stimulating the loaded vessels of the nerve, causing them to contract and expel the blood with which they are surcharged.

The best method of introducing the kreosote, is by means of a camel's hair pencil. After this has been done, the cavity should be filled with cotton saturated with pure kreosote, care being taken, if possible, to prevent any adhering drops from touching and irritating the adjacent soft parts. If this should happen, however, the pain is but momentary, and is not attended with any serious consequences.

Dr. Elliottson has published several interesting cases of *cutaneous diseases*, in which the kreosote has effected a cure after various other means had been tried in vain. It has also been recommended in *chilblains*. Dr. Halm, of Stuttgart, says, that whether they are ulcerated or not, he accomplishes a cure in the course of a few days with a solution of kreosote in water. Several cautions should be borne in mind, in the application of kreosote to ulcers. It is of great importance in regulating the strength of the solution, to remember that water dissolves only one-eightieth part of its weight of kreosote. If a small excess of kreosote be present, it will float on the surface in the form of minute globules;

and, of course, when the lint or brush is dipped in the solution, these globules will adhere, and thus a much stronger preparation than was intended will be used.

Of all the beneficial effects of kreosote, however, there is probably none more important than its power of *allaying the irritability of the stomach*, and of controlling the most obstinate cases of nausea and vomiting. Its power in affections of this character (says Dr. Cormack,) exceeds all other known remedies; and Dr. Elliottson says, that he never knew it fail to arrest vomiting, proceding from functional derangement merely. Dr. E. also prescribed it with great advantage in a case of vomiting from arsenic; and several times successfully for "sea-sickness."—[American Journal of the Medical Science.]

THE RICH AND THE POOR.—The following excellent sentiment concludes an article by Professor Hare, on the causes of the present pecuniary embarrassments, and the remedy therefor.

"Never was an error more pernicious, than that of supposing that any separation could be practicable between the interests of the rich and the working classes. However selfish may be the disposition of the wealthy, they cannot benefit themselves without serving the laborer. Let the rich proprietor improve his land; let him build houses or ships; he must employ the poor, and while it is thus certain that the rich cannot serve themselves without serving the laborer, it is evident that whenever the rich are injured the laborer must suffer. If the laboring classes are desirous of having the prosperity of the country restored, they must sanction all measures tending to reinstate our commercial credit, without which the wealthy will be impoverished and the needy be rendered still more necessitous."

Agriculture, &c.

USEFUL IF TRUE.—"We every day hear complaints about watery potatoes. Put into the pot a piece of lime as large as a hen's egg; and how watery soever the potatoes may have been, when the water is poured off, the potatoes will be perfectly dry and mealy. Some persons use salt, which only hardens potatoes." So says one of the foreign journals, and we advise those who are compelled to use watery potatoes to try the lime. There is we think some philosophy in the recommendation, as the alkali of the time may correct the tendency to acidity always manifest in poor potatoes. By the way experience teaches us that good ripe *pink-eyes*, well secured in the ground through the winter, and kept dry till wanted, will keep till July or August, without becoming watery. —[Genesee Farmer.]

LIME.—Lime is said to be an excellent remedy for burns of scalds: equal proportions of lime, water, and any kind of oil, made into a thin paste, and immediately applied and repeatedly moistened, will speedily remove the effect of a burn; and if applied later, even when the blister has risen, the remedy never fails. This paste has been known to stop effusions of blood, when almost every thing else has failed. Dry lime thrown into a flesh wound is always healing.

EFFECT OF CLIMATE AND CULTIVATION ON VEGETABLES.—The *myrtle tree*, which, with us is a small shrub, grows in Van Dieman's Land to the height of 200 feet, and has a trunk from 30 to 40 feet in circumference. The wood resembles cedar.—The Chinese have an art by which they are able to produce miniature pines, bearing a perfect resemblance to the gigantic specimens of our country, and only five or six inches high.

From the New York Farmer.

TROPICAL FIBROUS PLANTS.

Continued from p. 211

10 o'clock A. M., 16th, 1837.

I have passed a very restless night yet will endeavor to proceed.

We now turn to the peculiarly fibrous leaved Agaves, known in Yucatan under the common generic name of Yucatan, and in my writings under the botanical appellation of Agave Sisabana.

I have often stated that there are two distinct *cultivated* varieties in Yucatan, designated by the Indian names of Yashqui and Sacqui. To shew at one view a great specific difference between the Henequens and the Magueys, or between the A. sisalana, and the A. americana, suffice it to repeat that the Yashqui variety of Henequen *is entirely destitute of spines on its edges*, while all the varieties of Maguey *have many spines projecting from their edges*. To repeat in other words, the leaves of Yashqui have *smooth* edges, the leaves of the Maguey have *spiny* edges; although both have a thorn at the extremity of their leaves.

The difference between the other variety of the Henequen, the Sacqui, compared with some varieties of the Maguey, is not so easy to describe in words, because the Sacqui has also spines on its edges. I have not with me the book in which I have noted down the minutiæ, but I can convey a general idea of one differenee very notable to the sight between this and all other varieties of Henequen compared with the varieties of the Maguey viz.: the relative *narrowness of the leaves*. Cut a leaf of any variety of the fibres producing Agaves, and cut another leaf of any of the drink producing Agaves, but let each leaf be of the same length. Let the two leaves lie together, and that leaf which is pronounced to be notably *broader* than the other belongs to the Maguey. So striking is this difference, that I have before me a winter bleached leaf, of both the Sacqui and Maguey, each 22 inches long, and while the width at the broadest part of the Sacqui is scarcely 2½ inches, the width of the Maguey is fully 5 inches, or double the breadth. It is true that the same disproportion will not exist in all leaves at all lengths, yet in all the difference in breadth is sufficiently notable to strike the most careless observer. I dwell on these facts at the risque of being tiresome, because I am convinced that ere long they will be deemed of high importance by all "intelligent friends of the Union." Mark then further the fact, that both the Sacqui and Yashqui varieties of the Henequen of Yucatan or Agave Sisalana, are still existing in the garden of this model farm.

8 o'clock, P. M.

It is in vain to struggle against sickness! My exertions are protracting my convalescence. I will nevertheless endeavor to finish this page. To show you how vague and erroneous are the ideas concerning the Agaves, take up a Spanish Dictionary and look at the definition of the words Pita and Cabuya. You will find that both are used as the names of plants, and the names of fibres extracted from the leaves of those plants, and yet both are included under the Botanical name of Agave Americana. Under the term Pita you learn that the leaves are eaten by cattle. Under the title Cabuya you are told that the foliaceous fibres are made into ropes. Indeed so common is the fabrication of these fibres in some parts of Spain that the manufacturer has acquired the special name of *Cabuyero*—i. e. manufacture of the foliaceous fibre called Cabuya. As the Spaniards manufacture the tough grass called by them *Esparto*, (Spartina tenacessima) the manufacturer himself is called *Espartero*, the wrought fabrics *Esparteria*. The fact of the invention of the names is the best evidence of the common existence of the things, and processes they represent. So the terms Cabuyero and Cabuyeria imply that in Spain foliaceous fibre is well known. The only rational influence to be drawn from these facts is, that in Spain various species of Agave are acclimated—that they not only have the juice producing Magueys or varieties of Agave Americana, but that they also have the fibre producing Henequen or varieties of the Agave Sisalana.

If then in Spain where the Agaves are so numerous, and where even fibrous leaved species furnish products for common manufacture, the ignorance of the books is so manifest, it is not so astonishing that the writers of France should have imperfect notions on the subject. In the latest Agricultural work, the Maison rustique, published in 1836, and designed to be superior to the Agricultural Encyclopedia of London, there is merely a short article on the Agave Americana, by A. Poileau, in which he follows the errors of his predecessors, but which we must suppose contains a compend of their actual knowledge on this topic. I have copied it and intended to send it with this communication, but as I am too exhausted to accompany the requisite comments, I must break off until health permits me to address you again from some station during my travels. My present intention is to proceed as soon as I am able to New Orleans, Havanna, Key West, Cape Florida, Charleston, &c., to New-York.

Respectfully,

H. PEBRINE.

CITY POLICE—NIGHT SOIL MANURE, &c.

We continue, in this number, the article from the Farmers' Register, on City Police; and devote much space to the subject deeming it one of great importance; first, in point of *cleanliness* and *comfort* in large cities; secondly, as a means of largely increasing the productiveness of the soil, in the vicinity of large cities, and of course of increasing quantities, and reducing prices, of vegetables, and thirdly, it is very important to the cultivator of the soil, who, though he may sell at less prices, is sure to realize larger profits on his labor, from the increased quantities.

We ask the attention of our readers to the subject.

FRENCH METHOD OF PREPARING POUDRETTE AND URATE FOR MANURE.

To the Pennsylvania Agricultural Society.

Concluded.

"The attention of the Philadelphia Board of Health, has been earnestly directed towards discovering some mode of disposing of the contents of privies, which would remove from the precincts of our city, where the deposites are made, a nuisance at present of a very formidable character, and which must necessarily increase. In pursuance of this object, the board has concluded, that an effectual remedy for the evil is only to be sought in the conversion of the offensive substance into *inodorus manures*, after the methods now successfully practised in many parts of Europe, and especially in the cities of Paris and London.

"The principle by which this object is effected, is simple, and consists in the drying, or desiccation of the urinary and fœcal matters, either, apart or together, by the addition of certain absorbent substances, such as plaister, lime, chalk, ashes, &c. It is probable that the ashes of the Lehigh and Schuylkill coal may be thus usefully disposed of. The manure prepared from the fœcal or more solid contents of privies, has long been known, and highly esteemed by the gardeners and agriculturalists of France, under the name of *poudrette*. That prepared from the urinous portion is comparatively of modern invention, and is called *urate*.

"Aware that such a plan is not to be carried into effect under the special direction of either your society or their own body, the board lays the subject before you, in the hope that its advantages will be properly investigated and made known, so as to lead to useful results; for surely, nothing can be more worthy of general and special encouragement, than a plan not only calculated to promote the health and comfort of our large community, but to render essential assistance to the most important of the useful arts, insuring at the same time liberal profits to those actually engaged in its execution.

"That your society may be placed in possession of more particular information relative to the subject under consideration, the board would refer you to numerous highly favorable reports and interesting proceedings of the most respectable associations established in Europe for the encouragement of agricultural and useful arts, among which we would especially call your attention to those of the French "Royal and Central Agricultural Society." and the "Society for the encouragement of National Industry," during the years 1818–19–20.

"The following translation of a French document, furnishes an accurate detail of the process by which the *urate* is manufactured, and throws much important light upon the subject generally:

"Certificate granted upon the application for a brevet [patent] of invention, to M. Donat, (Joseph Etienne-Victor-Gabriel,) residing at Paris, department of the Seine,

"The Ministerial Secretary of the State, for the department of the interior, considering the Memoir of M. Donat, proprietory, residing in Paris, Rue des Bons-Enfans, No. 28, in which he states his desire to enjoy the proper rights secured by the law of the 7th of January, 1791, to the authors of inventions and discoveries in all kinds of industry, and to obtain in consequence, a brevet of invention for fifteen years, for the sudden drying of the urinary portion, and manipulation of the contents of privies, within the twenty-four hours succeeding their removal; all by particular means and processes, of which he declares himself the author, as it appears from the verbal process addressed at the time, to the depot of documents attached to the secretaryship of the department of the Seine, the 19th of January, 1819.

"Considering the designs of the apparatus, and the descriptive memoir of which the following is a copy.

"I have contrived a plan which affords me the means of extracting from urinary and fœcal matters, a manure very superior to those hitherto known. Desirous of securing to myself the exclusive enjoyment of my invention, I have made application to the prefecture, department of the Seine, conformably to the laws of the 7th of January and 25th of May, 1791, for a brevet of 15 years, for the complete and immediate desiccation of fœcal and urinary matters together, or separately, by means of absorbents which I add, such as lime, plaister, chalk, marl, ashes either natural or mineral, such as are taken from the different ash mines. Substances having calcareous bases may be calcined for the absorption of a greater quantity of liquid, at least when the high price of the combustible, or the low price of the absorbent, do not offer greater advantages in using it directly from the quarry.

"This variety of absorbent substances, assures to every country the means of manufacturing a very abundant and active manure with human dejections. The product of my operations is inodorous, for two reasons: The first is, that when urine is employed, it gives out no odor after the absorption of its moisture; The second is, when the fœcal matters are sufficiently mixed with the absorbent, I bury them at least 18 inches deep, to prevent the disengagement of the odor during the fermentation necessary to the good quality of the manure.

"I give to the manure made with pure urine and one of the aforesaid substances, the name of *urate*. I believe that this composition, mixed or combined with that resulting from the combination of fœcal matters with a certain quantity of one of the aforesaid absorbent matters, produces a manure of great activity. The only difficult point is, to ascertain the proper proportions for the admixture.

"For the manufacture of the urate on a large scale, it is necessary to construct at least six basins, in form of a watch glass inverted. They should hold about 12 hectolitres, (about 300 gallons,) of which there will be six of urine and six of the absorbent matter of one of the kinds formerly designated, freshly calcined.

"The cask or vessel holding the urine, is to be so placed that it will empty itself through its bung into the basin. During this operation, one workman is employed in pouring in the plaister, another in mixing it in the basin with a rake or scraper.

"When the mixture is finished the operators pass to another, and so on to the sixth. Then the first is emptied for the purpose of commencing operations anew. The mixture is finished by further drying in the air.

"At the end of the day, the quantity of urate which has been made since morning, is to be broken down by means of a cast iron cylinder rolled over it; after which it is sifted, (*passee a la double claie.*) and then immediately stored or packed up, to prevent the absorption of moisture.

"By this combination, the urine being dried by its union with the absorbent matter, which is itself a manure, unites all the vegetative powers of its two component parts, and will constitute the most productive of all manures, in consequence of the very small quantity that is necessary to employ to procure the best results.

"I have designated six substances as being proper to absorb the superabundant water of urine, and I have only mentioned them without pointing out any particular one, as I thought that no country is without some one of them. But in case I am mistaken in this opinion, very great advantages may still be derived from urines, by mixing them with burnt earth, (that of heath soil is to be preferred,) or with natural ashes (*cendes naturelles.*) I only estimate the value of this mixture as a means of obtaining all the salts of urine in a solid state, which will facilitate its transportation and employment in agriculture.

"The ancients considered urine as the most powerful of manures. This is not therefore the end of my invention, which consists alone in its sudden desiccation and solidification, and the draining or drying up of these infectious depositories of the substance to be met with in the environs of large cities, where they furnish inexhaustible sources of unhealthy exhalations.

"I leave it to thsoearned societies to express their judgment upon the qualities of the urate, and restrict myself to the application for a brevet of invention, for a method of preparing it immediately, so as to destroy at the same time the odor of the urine.

(Signed) DONAT.

"*Paris, January 19th*, 1819."

["Here follows the certificate granting the brevet or patent to M. Donat, for 15 years, signed by the Ministerial Secretary of the interior department, Count Decazes.]

"Signed for and on behalf of the board of health.

SAMUEL J. ROBBINS.
President.

Attest,
THOS. A. RITCHIE, Sec.
Philadelphia, January 16th, 1826."

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However beneficial may be this plan both for cleansing a city and for forming rich manure, it is evident that the process is not conducted upon uniform, and rarely upon correct principles—which I consider are only conformed to when the absorping matter used in some form of *mild* calcareous earth. By calcining this material, as the inventor recommends, a destructive, instead of a preserving ingredient is formed—and one which never should be used to mix with fœcal or other animal matter, if the value of the product, as manure, is of any account. Far better than this French method is that which has been in use time out of mind among the Chinese—a people, who however unenlightened in science, are in advance of most other nations in the means for preserving and increasing the fertility of the earth. Travellers have informed us, that in that country, human excrements are mixed with clay marl (doubtless rich in calcareous earth) The mixture is made up in the form of cakes, which after being dried, are free from all offensive odor, and indeed give to the senses no indication of their composition; and they are exposed in quantity in the streets for sale, as manure for the neighboring lands.

There is an obvious objection to, or ground to doubt, the effects imputed to decomposing filth as causing disease, in this well known fact, that in spite of this and all other sources of disease, our towns are more free from autumnal sickness, (the effects of *malaria*) than much of the neighboring and surrounding country; and that the towns have all become more healthy, as they have increased in age and population. These general facts are admitted to be correct, but the inference from them is denied, on the following grounds.

In the first place—bad as may be the effects of the gaseous or aeriform products of animal putrefaction, it is well known that they are much less productive of malaria than are those of vegetable putrefaction. This I believe is a well established and universally received medical fact. And as our *police of health* in the country is at least as bad as in the towns, (though the nuisances are of a different character,) it may well happen, that the vast quantity of decomposing vegetable matter in the woods and in the fields, where there is no calcareous ingredient in the soil to combine with products of decomposition, and to fix them there—together with the pestilential effluvia from the numerous mill ponds, which more or less affect injuriously half the places of residence in lower and middle Virginia—may produce more malaria and disease, than the decomposition of annual filth in the towns. Besides, there are counteracting agencies always operating to lessen the ill effects of decomposition of filth in towns, though such operation is neither intended, nor understood, by those who profit by it. From various sources, the calcareous earth in towns is always accumulating. The ashes of all the wood consumed as fuel, furnish a large and rich supply—and though these are sometimes conveyed away for manure, still the far greater part is scattered about the town. Coal ashes, in a much less degree as to strength, also add to the stock. The waste of lime, and the old cement of buildings repaired or demolished, all furnish calcareous matter, and all, though without its being designed, are in time spread every where. But the burning of a town, or a large portion of it, as stated in the first part of these papers, furnishes the great supply of calcareous matter—enough indeed to give a very heavy dressing to the whole space burnt over, and much more—and to serve to combine with all the animal matter for a number of years, and to give permanently to the soil of the town, that valuable quality which is entirely wanting in that of the surrounding poor country.

There is one still more foul abomination in our present system, which has grown out of the want of proper public accommodations, and the extreme difficulty (not to say indecency) of daily removals of uncombined and unchanged excrements from private houses. The practice alluded to belongs to the most crowded parts of cities, and has proceeded from them, and from Europe, to this country, where as yet it is but little used. Where space is very costly, deep pits are dug beneath privies, from which the contents are not removed for years together, and more probably *never*. They do not become *full* (or at least very slowly,) and thereby *compel* their being emptied—because after a certain bulk of the highly putrescent matter has been accumulated, the waste by decomposition goes on nearly or quite as fast as the increase from the additions of material. If quicklime is added, this decomposition is hastened, and a different, though but little offensive odor is substituted. But whether these depositories are cleaned out at long intervals, or not, there can be no question but that nineteen-twentieths of the whole mass goes off by decomposition, and is mixed with the atmosphere; and however diluted, or however altered by mixture, helps to form the air breathed by the inhabitants of towns—who are too delicate, and too fastidious, to have all such nuisances prevented by proper, general and public regulations. We have not yet been enough crowded in our towns for the last mentioned practice to have gone to much extent. But as it is the result of (supposed) necessity, it will increase with the growth of the towns; and as such receptacles will be of course concealed as much as possible from observation, their existence will not be known, nor the extent of the evil estimated, and scarcely even suspected.

In France, in past times, when there was neither the refinement of manners, nor the knowledge of the evils produced, that now would forbid the introduction of such a usage, large and deep covered pits, or vaults, to privies, were common in the smaller towns, and which were by no means kept for private use. In such public places (*fosses d'aisance*) the rapid accumulation made it absolutely necessary to remove the matter sometimes, though very rarely; and a description of the state of things at such times, and the effects produced on health, and even the necessity of guarding against them, will serve to show to our citizens, who have never thought of any evils except that of offensiveness to the senses and to decency, that effluvia, always hurtful and sometimes deadly in effect, are actually evolved. And it should be borne in mind, that the same effluvia must be extricated from similar accumulations also, though the effects are diminished according to the smaller amount and more gradual extrication, or more diluted state of the doses inhaled by the surrounding population.

There is another and still more disgusting, and still more evident effect of accumulations of putrescent animal matters in towns, presented in the infiltration of the fluid parts though pervious strata of earth, and the consequent admixture with the water supplying springs and wells. This part of the subject may be resumed, and treated more at length in a future number of these observations, so as not now to interrupt the consideration of the effects of gaseous or aeriform products of accumulations of putrefying animal matters.

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No. III.

THE POLICE OF FILTH, IN TOWNS, CONTINUED FACTS AND OPINIONS ON THE SUBJECT FROM FRENCH AUTHORITIES.

The following article, which I have translated from Rozier's "*Cours Complet d' Agriculture*." *etc.* (Paris edition, of 1815,) will serve to present in a stronger point of view the dangers to health caused by accumulations of fœcal matters in towns. The reader may be instructed by its facts and reasoning, as to the importance of the subject to health—and he will also be amused by the display of technical terms, and form of scientific arrangement and classification, applied to such a subject. But this manner of the French author, nevertheless, furnishes additional evidence that the subject has been long studied in his country, and therefore, that the results obtained, and the opinions derived, are the more entitled to respect.

It is proper to premise, that in France, and elsewhere in Europe, the poorer cultivators and inhabitants of the country do not generally have separate and isolated dwellings, as in the United States, but are collected in villages, or hamlets which are surrounded by the fields which the inhabitants cultivate, and the pastures on which their cattle graze. This state of things, which was originally required for mutual security, and which old habits still retain in use, has no existence in the Unit-

ed States, except among some cultivators of French descent, on the Mississippi, and the laborers in cotton or other large factories It is to villages, and perhaps crowded villages, that the author refers, in the following piece, when speaking of the "*country*;' and the "*fosses d'aisance*" of which he treats were common to the use of many persons. The injurious effects described, like the circumstances which produced them, are also (as yet) without parallel in this country. But we have no right thence to suppose that our different habits lead to no danger, or to much less evil than the deep and large vaulted "*fosses d'aisance.*" In the latter, as described in the French account, the accumulation of fœcal matter, and the concentration of the energy of its poisonous products, serve to exhibit its worst virulence bearing upon a small space, and upon the very few persons most exposed by nearness, or actual contact. But if the matter was diffused, as by the practices and habits of our population, the same kind of fermentation would proceed, the same products be exhaled, and as much deadly aeriform poison be evolved and breathed, but rendered scarcely sensible in effect, by being widely diffused over much space, greatly diluted, and thus divided among a much greater number of persons.

[*Translation.*]

Fosse d'Aisance. This subject relates directly to agriculture, as furnishing one of the most excellent manures, at the same time that it interests the health, and even the life of the cultivator; for, how many casualties occur in the country [villages] by the emptying of these pits, for want of knowing the means of preventing them!

We shall not speak of their construction, which makes an essential part of the art of building; but we are going to enter upon some details in regard to the various substances which compose the matter, or contents, of the pits. We have not to fear exciting the *disgust* of the cultivator; accustomed as he is to excrementitious matters, he will consent that we shall instruct him concerning that of which he is less informed.

These substances are distinguished by the names of the *crust* (*croute*) *hecate*, *vanne*, and *scrapings* (*gratin*) The *crust* has often sufficient thickness and firmness to sustain the weight of the laborers walking on its surface! The *hecate* is the pyramidal heaps. The *vanne*, is the liquid part, usually of a green color, and is corrupted (*infecte.*) The *scrapings* are the parts adhering to the walls, and to the bottom of the pit.

The crust is sometimes pushed up (from the mass below) by a sufficiently voluminous layer of mephitic gas, so as to induce the belief that the pit is full. In this case, the emptying of the pit may be put off to a future time, by merely opening into, and facilitating the escape of the intermediary layer of gas, and thereby lowering the crust.

We proceed now to the accidents occasioned by the emptying, and often even by the mere opening of a (covered) pit. Frequent as such accidents are in the cities, they are much more so in the country [villages,] in consequence of the little experience of this operation. The two only means of preventing them are, quicklime and fire.

This article, in Rozier, occupies much extent,* and contains a *Memoire sur les Fosses d'Aisance*, which I had prepared when I was engaged in investigating the subject, in concert with Laborie and M. Parmentier. The employment of quick lime consists in slaking it to put it in a state of powder, or to make a fluid by mixing it with very little water, and to introduce it into the contents of the pit, by stirring it with a pole; then the mephitic exhalations are destroyed or confined. The proportion of lime required, depends on the mass of matters, and the cessation of the existence of mephitic gas, of which we may be assured by letting down a lighted candle to the surface. If the flame is extinguished, or even burns dimly, there is still mephitic air undecomposed, and more quick lime is to be added.

As to fire, there are many modes of applying it. Either a chafing-dish of burning coals is placed in the pit, and left there to burn out completely, or dry straw is lighted on it. It is useful to make (in the walls) air holes; they may serve for the escape of the lightest gases; but how little do they draw, when the atmosphere weighs on their orifices! For it is of the *fosse d'aisance* as of the barometer—or rather it is one of the most faithful of barometers. The weather will continue clear, as long as, from the holes over the pit, there arises *ammonia*, that purgent odor so sensible to the eyes, and to the smell.

The crust is sometimes firm enough, I have said, for the workmen, without inconvenience, to walk upon its surface. This surface is commonly covered with sulphur, as is also often the vault (or arched covering) of the pit to which the sulphur sublimes, and fixes on. Sulphur is a very abundant product of the fermentation of animal substances: under these circumstances it is formed in the humid mode. When charged with the excavation of the half-moon of the gate of Saint-Antoine, which, from a very remote period, had been made a common receptacle of filth, (*voirie.*) I was struck with the enormous quantity of sulphur with which the earth was impregnated. It is to this sulphur, or rather to the sulphuretted hydrogen gas, which is formed in the pits, and is the most mephitic of known gases, that are principally owing the accidents produced by the operation of emptying these receptacles.—M. Dupuytrein has thrown much light upon the different gases held by the matter of the *fosse d'aisance.* At the time when I was occupied in this investigation, Lavoisier, the Abbe Fontanes, whom I had invited to repeat or examine the experiments, could not pronounce upon diversity of eminent gases; of which one kind, the *mitte*, [as vulgarly termed,] which limits the effects to causing to the workman a momentary blindness, seeming to affect merely the system of optic nerves—whilst the other occasions the painter's colic, and conducts its victim to the state of paralysis, to asphyxia, and finally to death. The experiments of M. Dupuytrein, though interesting in their relation to science, have changed nothing in the preservative means which we have stated, to wit, quicklime and fire, as the destructive or ventilating agents. It is to the negligence of these means, I repeat, to which is to be attributed the accidents that occur from time to time

Lime is the most energetic disinfecting agent. Throw it into the putrid fluid (*vanne*) of a *fosse*, and it becomes instantly inodorous; it fixes (*enchaine.*) it decomposes all the mephitic gases. It is thus, that when thrown into a *fosse*, it suspends the extrication of infectious emanations, at the same time that it arrests the tumescence and fermentation of the matter, which is lowered, and the space of time before the emptying becomes absolutely necessary, is thereby prolonged. It is recommended by many to throw snow into the pits, on the pretence of its economizing the emptying, because, as it is said, the snow consumes the excrementitious matter. If the soil in which a pit is sunk is so pervious as to permit the infiltration of the liquid portion of its contents, then the adding of snow (that is, water,) by giving more fluidity, will facilitate the imbibing by the soil. But if the pit is well and solidly constructed, and loses nothing by filtration, the addition of snow does but augment the mass, and hasten the time of emptying. It is thus that people assert every thing, because they believe every thing—and ignorance loves best that which is the most improbable.

There is a phenomenon which it is suitable to mention in this article, as sometimes causing accidents. It often happens that children throw lighted papers down through the orifices of the seats over the *fosses.* When our *barometer-fosse*, in place of ammonia, exhales sulphuretted hydrogen, the gas, the most combustible of all, takes fire, with explosion; and if a sufficient quantity of sulphur is formed upon the crust, or upon the arched roof, the bursting of the roof of the pit may be the result. This gas of *fosses* is also met with in mines, and takes fire there from the lamps of the workmen. But in the mines, the explosion is seldom attended with injury, because there is communication by galleries, or by the ceiling, with the atmosphere: the workman throws himself flat on the floor, and it is as much if his hair is singed by the meteor-like fire, which burns but little, and very rapidly.

But why should *fosses* be permitted to exist, when their contents occasion so many accidents. The cleaning out is the profession the most abject and most disgusting; and it is difficult to conceive how men can devote themselves to it voluntarily. Certainly, humanity would not permit that a legislator should ascribe such a punishment on the penal code. The workmen employed in this wretched business, raises the stone that serves to close the entrance to the vault, and often there immediately exhales a *mofette*, or gas, dangerous or mortal.—Another *mofette* is found under the crust into which he cuts,

* It is the writer of this article, Cadet de Vaux, who speaks, and probably in reference to the previous edition of Rozier's *Cours Complet.*—Ed. Far. Reg.

which escapes at the first stroke of the hoe. He puts down his ladder, and descends into this gulf; he makes the reign of the cross, asking the protection of Heaven. He draws out the putrid fluid; at the end of some minutes, it is the *mitte** which reaches him; he is struck with blindness; he is drawn out, if not blind, at least deprived of sight for more or less time. Or perhaps it is the *plomb*;* his knees fail, he staggers, and has a universal trembling, cold siezes him, he breathes with difficulty, and he is conducted to the hospital to await the coming of convulsions, violent colic, and other pains, and paralysis which often becomes permanent. Another workman succeeds the first; he has a rope fastened around his breast and beneath his arms, while the other end is held by one of his comrads above, who follows him with his eye, and is ready to draw him up, if he plunges into the *vanne*, or falls extended upon the more solid mass, struck by asphyxia, (fainting) if not by death. It was doubtless, the existence of *fosses d'aisance* among the Greeks, which has furnished grounds for the fable of the mouths of Styx and the Cocytus. The noted Grotto del Cane (of Italy,) does nothing but produce asphyxia—that is to deprive of the signs of life, which are restored immediately by the subject being plunged in the water of the neighboring lake, Agnano. But it is not the same with asphyxia occesioned by the emptying of *fosses d'aisance*. The sulphuretted hydrogen gas is quite another thing to the carbonic acid gas.

The numerous accidents occasioned by the emptying of *fosses d'aisance* were among the first objects which exercised my zeal in the career of public utility to which I have consecrated my labors. In consequence, I enlisted the solicitude of government, and proposed to it to unite myself with Laborie and M. Parmentier, for continuing the researches which were alike interesting to humanity, to science, and to agriculture. Chemistry had analyzed the excrementitious matters; it had commenced to analyze the gases; but it had not penetrated into the interior of the *fosses d'aisance*, the only laboratory in which to examine the phenomena which the most putrescent substance presents.—From these researches, it has resulted, that no workman who will take the precaution which we have proposed in the use of quicklime, and of fire, ought to perish in cleaning out *fosses* or wells; or in the excavation of mephitic soils, to which I have applied, with no less efficacy, these cautionary means against death and asphyxia.

Soft stone (*pierre tendre*) should be used for the construction of *fosses d'aisance*; hard stone has not sufficient resistance.—The gases the most active, the most solvent, exhaling from the excrementious matters which are undergoing an uninterupted process of fermentation, tend to soften the stone, which they penetrate to a great thickness. I have seen walls of extreme solidity, of which the surface might be crumbled by the fingers—not only the wall of the *fosses*, but those of the body of the [upper] building forming the privies; whilst the soft stone permits the penetration of the viscous fluid, which thus forms a coating that prevents infiltration.

The circular form is so much the more necessary, as I have seen [square] *fossés* of which the cleaning caused no accidents to the moment when, the centre being emptied, the corners were commenced upon. Nothing is more dangerous than to meet with bunches of straw or hay, which have been thrown into the pit; it is rare that they do not conceal a *mofette*, or mephitic gas. In general, all foreign substances add much to the dangers of emptying; it is thus that soap waters [which have been used for washing,] may cause a *fosse* to be fatal to the workmen engaged in emptying it.

* * * * * *

I will observe that pits for farm-yard dung, ought to be considered as true *fosses d'aisance*, in regard to their putrid fluid part, the mephitic gas which they evolve, and consequently, of the accidents, which are of similar character, which attend the emptying of *fosses* of farm yard dung; so that the means indicated as safe-guards in the one case, suit also for the other.

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* These are provincial names given to the different exhalations, (or *mofettes*), as distinguished by their different poisonous effects on these exposed to their greatest power.—Ed

New-York, June 15th, 1837.

THIRD ANNUAL FAIR OF THE MECHANICS' INSTITUTE OF THE CITY OF NEW-YORK.

The *Fair* of the Institute will be held at Niblo's Garden, commencing Monday, September 25th, 1837.

To render this exhibition worthy of the arts and of the ingenuity of the Mechanics of our country, the Managers appointed to conduct the approaching *Fair* have determined to make such liberal arrangements as will insure to the contributors a fair opportunity of exhibiting their productions to the greatest advantage.

The object of Exhibition Fairs is to present to the members of the Institute and their fellow citizens who are engaged in the Mechanic Arts, the means of making their skill and ingeunity known in a way no other facilities afford: the many thousands who visit such exhibitions have a much better opportunity of judging of the merits of the various productions, than they would have by a mere verbal or newspaper description, besides the advantage of seeing brought together, in one vast collection, the products of the skill, ingenuity, and industry of our country.

PREMIUMS of Medals, Diplomas, &c. will be awarded for *all* worthy or meritorious articles exhibited, either as it respects superior workmanship, machinery wherein the operations are new, interesting or important, where ingeunity is displayed, or taste manifested, and particularly for all new and useful inventions.

You are respectfully requested to send, for competition or exhibition, specimens of the articles you manufacture; and you may be assured that the strictest impartiality will be observed in the distribution of the Premiums.

Steam power will be provided for the accommodation of those who wish to exhibit Machinery in operation; an experienced Superintendant will take charge of this department, and contributors in this branch are particularly invited to send or bring their Machines or models as early as possible, on the 23d September, that the necessary arrangements may be made in relation to shafting, pullies, &c.

The Managers, in conclusion, cannot but express their belief that this Third Fair of the Mechanics' Institute, will exceed in variety and beauty of display, all previous exhibitions of the kind.

GEORGE BRUCE, *Chairm.*,
WM. EVERDELL,
C. CROLIUS, JUN.
THOS. EWBANK,
RICHARD BRAGAW,
} *Executive Committee.*

N. B. All articles for competition must be delivered to the Committee at Niblo's Garden, on the 23d September. Those for exhibition *only* will be received any day during the Fair, before 10 o'clock A. M.

RULES AND REGULATIONS.

1.—The Garden will be opened for the reception of Goods, on Saturday, 23d of September, from 6 o'clock A. M. until 9 o'clock P. M., and it is respectfully urged that all articles intended for competition may be sent in early in the day. Those articles intended for exhibition *only* will be received any day during the Fair, before the hour of 10 A. M.

2.—The Fair will open for visitors on Monday, 25th September at 10 o'clock A. M., and continue open every day of the exhibition till 10 o'clock P. M.

3.—Competent and impartial Judges will be appointed to examine all articles presented, and premiums will be awarded on all such as shall be declared worthy.

4.—The Committee on Premiums, and all firms or partnerships in which they may be interested, shall be excluded from competition or the award of any premium.

5.—All persons depositing articles, either for competition or exhibition, must attend to have them registered by the Clerk, at which time they will receive a certificate, which will be required of them when the articles are returned.

6.—Proof of origin must be furnished if required, for any specimen offered for Premium.

7.—Depositors will receive a ticket from the Clerk, which will admit them and Ladies during the Exhibition.

8.—Arrangements will be made to exhibit, in operation, all working models that may be deposited—contributions in this

branch are invited—a competent person will take charge of all models sent for the above purpose.

9.—The morning of each day, until fifteen minutes before 10 o'clock, shall be appropriated exclusively to the Judges.

10.—Members will receive their tickets of admission by applying at the Institute Rooms, any time in the week previous to and during the exhibition.

11.—All articles offered by Apprentices, will be received, and adjudged as the production of Apprentices—they must furnish a certificate of name, age, with whom, and the time they have served as apprentices.

12.—Articles subject to injury by being handled, should be secured in glass cases—and contributors are requested to have a person to take charge during the hours of exhibition—in the intervals, efficient measures will be taken to protect property.

GENERAL COMMITTEE.

George Bruce,	John Ridley,
John M. Dodd,	Silas B. Simonson,
James J. Mapes,	Thomas F. Peers,
Thomas Ewbank,	Thomas G. Hodgkins,
Wm. Everdell,	George L. Spencer,
C. Crolius, Jr.,	Peter Wemmell,
A. J. Mason,	Richard Bragaw,
Thos. W. Bartholomew,	Ab'm Peitch,
A. Storms,	Wm. H. Hale,
Wm. Ballard,	Wm. J. Mullen,
Henry Cunningham,	James Thomson,
John Harold,	Abner Mills,
Joseph Trench,	L. D. Chapin,
James D. Phyfe,	A. Cammeyer,
John H. Mead,	Hiram Tupper,
John Conroy,	H. B. Robertson,
Jordan L. Mott,	James Thomas,
Samuel Carter,	H. G. Stetson,
George F. Nesbitt,	Ferris Owen,
Henry Worrall,	N. Berry,
W. B. Worrall,	O. Whittelesey,
James B. Cummings,	M. W. Emmons,
James Frost,	J. S. Anderson.

MECHANICS' FAIR.

Notice to Mechanics, Artisans, Manu-facturers, &c.—The undersigned give notice that the first Annual FAIR of the Massachusetts Charitable Mechanics' Association will be held in the city of Boston, in September next, commencing on Monday, the 18th, and continuing at least three days.

The Association have placed at the disposal of the Board of Managers, the sum of Five Thousand Dollars, to enable them to conduct the Fair upon a liberal scale; and they hope to be able to render satisfaction to all who may feel disposed to offer articles for exhibition.

Medals or Diplomas will be awarded to the owners of all articles that may be deem-ed worthy of such distinction; and the Managers intend that the strictest impartiality and fairness shall be observed in the distribution of Premiums.

The Managers, in furtherance of the subject they have in view, invite contributions, of articles from every department of industry; of choice specimens of American ingenuity and skill; rare and valuable domestic productions, natural or artificial; the delicate and beautiful handiwork of females; useful labor-saving ma, chines, implements of husbandry, and new models of machinery in all their varieties.

Judges will be appointed to examine all articles offered, and the managers will award a gold or silver medal, or a diploma, to all articles that may be pronounced by the judges worthy of reward.

Articles intended for exhibition, must be delivered on or before Wednesday, Septem-ber 13th.

Arrangements will be made to exhibit, *in operation*, any working models that may be offered, which will render the exhibition useful and interesting, and the managers respectfully invite contributions in this branch. A careful and competent superintendent will be appointed to take chare of all models sent for this purpose.

Board of Managers.

Stephen Fairbanks,	Jos. T. Buckingham,
John Rayner,	James Clark,
William Adams,	Henry W. Dutton,
Uriel Crocker,	George Darracott,
Gardner Greenleaf,	Wm. S. Pendleton,
James L. Homer,	Charles A. Wells,
James Barry,	Henry Bailey,
Joseph Tilden,	Jonas Chickering,
Ephraim Harrington,	Henry H. Barton,
Joseph Lewis,	Thomas Boyd,
Walter Frost,	Wm. Uunderwood,
Thomas J. Shelton,	George G. Smith,

John G. Rogers.

P. S. For any further information ad-dress JAMES L. HOMER, Corresponding Secretary, Boston.

Boston, March 24, 1837. m28–ts1

TRANSACTIONS OF THE INSTITUTION OF CIVIL ENGINEERS OF GREAT BRITAIN.

The first volume of this valuable work, has just made its appearance in this country. A few copies, say *twenty-five* or *thirty* only, have been sent out, and those have nearly or quite all been disposed of at *ten dollars* each—a price, although *not* the *value* of the work, yet one, which will prevent many of our young Engineers from possessing it. In order therefore, to place it within their reach, and at a convenient price, we shall *reprint* the entire work, with ll its enagravings, *neatly done* on wood, and issue in six *parts* or *numbers*, of about 48 pages each, which can be sent to any part of the Unite1 States by mail, as issued, or put up in a volume at the close.

The price will be to subscribors *three dollars*, or *five dollars* for two copies—*always in advance*. The first number will be ready for delivery early in April—Subscriptions are solicited.

AVERY'S ROTARY STEAM ENGINES.—AGENCY.—

The subscriber offers his services to gentlemen desirous of procuring Steam Engines for driving SAW-MILLS, GRAIN-MILLS, and OTHER MANUFACTORIES of any kind.

Engines only will be furnished, or accompanied with *Boilers* and the necessary *Machinery* for putting them in operation, and an Engineer always sent to put them up.

Information will be given at all times to those who desire it, either by letter or by exhibiting the engines in operation in this city.

Inquiries by letter should be very explicit and the answers shall be equally so.

D. K. MINOR,
30 Wall-st., New York.

FOR SALE AT THIS OFFICE,

A Practical Treatise on Locomotive Engines, with Engravings, by the CHEVALIER DE PAMBOUR—150 pages large octavo—done up in paper covers so as to be sent by mail—Price $1 50. Postage for any distance *under* 100 miles, 40 cents, and 60 cts. for any distance exceeding 100 ms.

ALSO—*Van de Graaff on Railroad Curves*, done up as above, to be sent by mail—Price $1. Postage, 20 cents, or 30 cents, as above.

ALSO—Introduction to a view of the works of the *Thames Tunnel*—Price *fifty cents*. Postage as above, 8 cents, or 12 cts.

*** On the receipt of $3, a copy of each of the above works will be forwarded by mail to any part of the United States.

DRAWING INSTRUMENTS.—E. & G. W. Blunt, 154 Water-street, New-York, have received, and offer for sale, Drawing Instruments of superior quality, English, French, and German Manufacture.

They have also on hand Levels of superior quality at low prices.

☞ Orders received at this office for the above Instruments.

☞ TO RAILROAD COMPANIES.

A PERSON experienced in the construction of Locomotive Engines (many of his Manufacture being in successful operation on important Railroads in the United States) and who is likewise thoroughly acquainted with the management of such machines, and, indeed, the entire ordeal of Railroads, is desirous of obtaining the situation of General Superintendant on some Rai road, South or West.

The most satisfactory testimonials of character and capability can be produced. Communications addressed to the Editors of this Journal, stating the location of Road, &c. will meet with prompt attention. 9t—24

RAILWAY IRON, LOCOMOTIVES, &c.

THE subscribers offer the following articles for sale.

Railway Iron, flat bars, with countersunk holes and mitred joints,

							lbs.
350 tons	2½	by	1,15	thin	length,	weighing	1 3/4 per ft.
250 "	2 "		½,	"	"	"	3 50/100 "
70 "	1½ "		½,	"	"	"	2½ "
80 "	1½ "		½,	"	"	"	1 25/100 "
90 "	1 "		½,	"	"	"	¾ "

with Spikes and Splicing Plates adapted thereto. To be sold free of duty to State governments or incorporated companies.

Orders for Pennsylvania Boiler Iron executed.

Rail Road Car and Locomotive Engine Tires, wrought and turned or unturned, ready to be fitted on the wheels, viz. 30, 33, 36, 42, 44, 54, and 60 inches diameter.

E. V. Patent Chain Cable Bolts for Railway Car axles, in lengths of 12 feet 6 inches, to 15 feet 24, 28 3, 31, 34, 34, and 38 inches diameter.

Chains for inclined Planes, short and stay links, manufactured from the E. V. Cable Bolts, and proved at the greatest strain.

India Rubber Rope for Inclined Planes, made from New Zealand flax.

Also Patent Hemp Cordage for Inclined Planes, and Canal Towing Lines.

Patent Felt for placing between the iron chair and ston block of Edge Railway.

Every description of Railway Iron, as well as Locomotive Engines, imported at the shortest notice, by the agency of one of our partners, who resides in England for this purpose.

A highly respectable American Engineer, resides in England for the purpose of inspecting all Locomotives, Machinery, Railway Iron &c. ordered through us.

A. & G. RALSTON & CO.,
29 tf Philadelphia, No. 4, South Front-st

ARCHIMEDES WORKS.

(100 North Moor street, N. Y.)
NEW-YORK, February 12th, 1836

THE undersigned begs leave to inform the proprietors of Railroads that they are prepared to furnish all kinds of Machinery for Railroads, Locomotive Engines of any size, Car Wheels, such as are now in successful operation on the Camden and Amboy Railroad, none of which have failed—Castings of all kinds, Wheels, Axles, and Boxes, furnished at shortest notice.

4—vtf H. R. DUNHAM & CO

MACHINE WORKS OF ROGERS, KETCHUM AND GROSVENOR,

Paterson, New Jersey. The undersigned receive orders for the following articles, manufactured by them, of the most superior description in every particular. Their works being extensive, and the number of hands employed being large, they are enabled to execute both large and small orders with promptness and despatch.

RAILROAD WORK.

Locomotive Steam-Engines and Tenders; Driving and other Locomotive Wheels, Axles, Springs and Flange Tires, Car Wheels of cast iron, from a variety of patterns, and Chills; Car Wheels of cast iron, with wrought Tires; Axles of best American refined iron, Springs; Boxes and Bolts for Cars.

COTTON WOOL AND FLAX MACHINERY,

Of all descriptions and of the most improved Patterns, Style and Workmanship.

Mill Gearing and Millwright work generally; Hydraulic and other Presses; Press Screws; Callendores; Lathes and Tools of all kinds, Iron and Brass Castings of all descriptions.

ROGERS, KETCHUM & GROSVENOR
Patterson, New-Jersey, or 60 Wall-st, N. York
3tf

TO RAILROAD CONTRACTORS.

PROPOSALS will be received, at the office of the Hiwassee Railroad Com., in the town of ATHENS, TENNESSEE, until sunset, on Monday, June 12th, 1837; for the grading, masonry and bridges, on that portion of the HIWASSEE RAILROAD, which lies between the River Tennessee and Hiwassee. A distance of 40 miles.

The quantity of excavation will be about one million of cubic yards.

The line will be staked out; and, together with drawings and specifications of the work, will be ready for the inspection of contractors, on and after the 1st day of June.

JOHN C. TRAUTWINE,
Engineer in Chief Hiwassee Railroad.
16—6t.

FRAME BRIDGES.

THE undersigned, General Agent of Col. S. H. LONG, to build Bridges, or vend the right to others to build, on his Patent Plan, would respectfully inform Railroad and Bridge Corporations, that he is prepared to make contracts to build, and furnish all materials for superstructure of the kind, in any part of the United States, (Maryland excepted.)

Bridges on the above plan are to be seen at the following localities, viz. On the main road leading from Baltimore to Washington, two miles from the former place. Across the Metawamkeag river, on the Military road, in Maine. On the national road in Illinois, at sundry points. On the Baltimore and Susquehanna Railroad at three points. On the Hudson and Patterson Railroad, in two places. On the Boston and Worcester Railroad, at several points. On the Boston and Providence Railroad, at sundry points. Across the Contoocook river at Henniker, N. H. Across the Soukegan river, at Milford, N. H. Across the Connecticut river, at Haverhill, N. H. Across the Contoocook river, at Hancock, N. H. Across the Androscoggin river, at Turner Centre, Maine. Across the Kennebec river, at Waterville, Maine. Across the Genesee river, at Squirrel hill, Mount Morris, New-York. Across the White River, at Hartford Vt. Across the Connecticut River, at Lebanon, N. H. Across the mouth of the Broken Straw Creek, Penn. Across the mouth of the Canaraugus Creek, N. Y. A Railroad Bridge diagonally across the Erie Canal, in the City of Rochester, N. Y. A Railroad Bridge at Upper Still Water, Orono, Maine. This Bridge is 500 feet in length; one of the spans is over 200 feet. It is probably the FIRMEST WOOD N BRIDGE ever built in America.

Notwithstanding his present engagements to build between twenty and thirty Railroad Bridges, and several common bridges, several of which are now in progress of construction, the subscriber will promptly attend to business of the kind to much greater extent and on liberal terms. MOSES LONG.

Rohester, Jan 13th, 1837. 4—y

ALBANY EAGLE AIR FURNACE AND MACHINE SHOP.

WILLIAM V. MANY manufactures to order IRON CASTINGS for Gearing Mills and Factories of every description

ALSO—Steam Engines and Railroad Castings of every description.

The collection of Patterns for Machinery, is not equalled in the United States 9—ly

NEW ARRANGEMENT.

ROPES FOR INCLINED PLANES OF RAILROADS.

WE the subscribers having formed a co-partnership under the style and firm of Folger & Coleman, for the manufacturing and selling of Ropes for inclined planes of railroads, and for other uses, offer to supply ropes for inclined planes, of any length required without splice, at short notice, the manufacturing of cordage, heretofore carried on by S. S. Durfee & Co., will be done by the new firm, the same superintendant and machinery are employed by the new firm that were employed by S. S. Durfee & Co. All orders will be promptly attended to, and ropes will be shipped to any port in the United States.

12th month, 14th, 1836. Hudson, Columbia County State of New-York,

ROBT. C. FOLGER,
33—tf. GEORGE COLEMAN,

AMES' CELEBRATED SHOVELS, SPADES, &c.

300 dozens Ames' superior back-strap Shovels
150 do do do plain do
150 do do do cast steel Shovels & Spades
150 do do Gold-mining Shovels
100 do do plated Spades
50 do do socket Shovels and Spades.

Together with Pick Axes, Churn Drills, and Crow Bars (steel pointed,) manufactured from Salisbury refined iron—for sale by the manufacturing agents,

WITHERELL, AMES & CO.
No. 2 Liberty street, New-York
BACKUS, AMES & CO.
No. 8 State street, Albany

N. B—Also furnished to order, Shapes of every description, made from Salisbury refined iron v4—tf

STEPHENSON,

Builder of a superior style of Passenger Cars for Railroads.

No. 264 Elizabeth street, near Bleecker street, New-York.

RAILROAD COMPANIES would do well to examine these Cars; a specimen of which may be seen on that part of the New-York and Harlaem Railroad now in operation. 325tf

PATENT RAILROAD, SHIP AND BOAT SPIKES.

*** The Troy Iron and Nail Factory keeps constantly for sale a very extensive assortment of Wrought Spikes and Nails, from 3 to 10 inches, manufactured by the subscriber's Patent Machinery, which after five years successful operation, and now almost universal use in the United States, (as well as England, where the subscriber obtained a patent,) are found superior to any ever offered in market.

Railroad Companies may be supplied with Spikes having countersunk heads suitable to the holes in iron rails to any amount and on short notice. Almost all the Railroads now in progress in the United States are fastened with Spikes made at the above named factory—for which purpose they are found invaluable, as their adhesion is more than double any common spikes made by the hammer.

*** All orders directed to the Agent, Troy, N. Y., will be punctually attended to.

HENRY BURDEN, Agent.
Troy, N. Y., July, 1831.

*** Spikes are kept for sale, at factory prices, by I. & J. Townsend, Albany, and the principal Iron Merchants in Albany and Troy; J. I. Brower, 222 Water street, New-York; A. M. Jones, Philadelphia; T. Janviers, Baltimore; Degrand & Smith, Boston.

P. S.—Railroad Companies would do well to forward their orders as early as practicable, as the subscriber is desirous of extending the manufacturing so as to keep pace with the daily increasing demand for his Spikes. (1J23am) H. BURDEN.

TO CONTRACTORS.

JAMES RIVER AND KANAWHA CANAL.

THERE is still a large amount of mechanical work to let on the line of the James River and Kanawha Improvement, consisting of twenty locks, about one hundred culverts and several large aqueducts, which will be offered to responsible contractors at fair prices.

The locks and aqueducts are to be built of cut stone

The work contracted for must be finished by the 1st day of July, 1838

Persons desirous of obtaining work are requested to apply at the office of the undersigned, in the city of Richmond, before the fifteenth of May, or between the fifth and the fifteenth of July.

CHARLES ELLET, Jr.,
Chief Engineer Jas. Riv. & Ka. Co.

P. S—The valley of James River above Richmond is healthy.

16—10t

TO RAILROAD CONTRACTORS.

SEALED proposals will be received at the office of the Selma and Tennessee River Railroad Company, in the town of Selma, Alabama, for the graduation of the first forty miles of the Selma and Tennessee Railroad. Proposals for the first six miles from Selma, will be received after the first of June, and acted on by the Board on the 15th May. Proposals for the ensuing 34 miles, will be received after the 10th May, but will not be examined until the 1st of August next, when the work will be ready for contract.

The line, after the first few miles, pursuing the flat of the Mulberry Creek, occupies a region of country, having the repute of being highly healthful. It is free from ponds and swamps, and is well watered—The soil is generally in cultivation, and is dry, light and sandy, and uncommonly easy of excavation.—The entire length of the line of the Selma and Tennessee Railroads, will be about 170 miles, passing generally through a region as favorable for health as any in the Southern Country

Owing to the great interest at stake in the success of this enterprise, and the amount of capital already embarked in it, this work must necessarily proceed with vigor, and I invite the attention of men of industry and enterprise, both at the North and elsewhere to this undertaking, as offering in the prospect of continued employment, and the character of the soil and climate, a wide and desirable field to the contractor.

Proposals may be addressed either to the subscriber, or to General Gilbert Shearer, President of the Company.

ANDREW ALFRED DEXTER, Chief Engineer.
Selma, Ala., March 20th, 1837. A 15 tf

ROACH & WARNER,

Manufacturers of OPTICAL, MATHEMATICAL AND PHILOSOPHICAL INSTRUMENTS, 293 Broadway, New York, will keep constantly on hand a large and general assortment of Instruments in their line.

Wholesale Dealers and Country Merchants supplied with SURVEYING COMPASSES, BAROMETERS, THERMOMETERS, &c. &c. of their own manufacture, warranted accurate, and at lower prices than can be had at any other establishment.

Instruments made to order and repaired. 14 1y